

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Environmental Protection and Management

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Enumerate the various Environmental Management Principles and explain any two principles. (10 Marks)
b. Enumerate the various drivers and barriers for sustainable development (any five in each). (10 Marks)

OR

2. a. Explain Abatement of Pollution. List out the major activities initiated under the various schemes on Pollution Abatement. (10 Marks)
b. Enumerate the Business charter tools for sustainable production and consumption (any ten). (10 Marks)

Module-2

3. a. Enumerate the various Environmental Quality objectives. Briefly explain any two. (10 Marks)
b. Distinguish between :
i) Pollution control and Pollution Prevention.
ii) Concentration and Mass Standards. (10 Marks)

OR

4. a. Explain Environmental Performance Evaluation Process using PDCA Cycle. (10 Marks)
b. Briefly explain :
i) Cleaner production and Clean technology.
ii) Zero discharge technologies. (10 Marks)

Module-3

5. a. Enumerate the benefits and barriers in implementing ISO 14001 in an Organisation. (10 Marks)
b. Explain EMS and EMAS. (10 Marks)

OR

6. a. Write Explanatory notes on :
i) Initial Environmental Review (IER) ii) Management Review (MR). (10 Marks)
b. Write a note on Environmental aspect and Impacts within an Organisational setup. (10 Marks)

Module-4

7. a. Write a process flow diagram for the Management of an Audit Programme as per ISO - 19011. (12 Marks)
b. Enumerate the contents of Environmental Statement (Form - V). (08 Marks)

OR

(10 Marks)

- 8 a. Write a note on Waste Minimisation Planning in an Industry.
 b. Explain briefly :
 i) Non - conformity ii) Roles and Qualifications of Auditors.

Module-5

- 9 a. Briefly discuss the applications of EMS and Waste Audit.
 b. Explain the concept of Transboundary of Pollutants.

OR

(10 Marks)

- 10 a. Discuss Pollution Prevention Opportunities in Pulp Paper and Sugar mills.
 b. Write a note on Hazardous Waste classification and characteristics.

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- a. Write a note on related environmental legislation of the following countries:
 i) India
 ii) United States
 iii) United Kingdom
 iv) Germany

Evaluation

- b. Explain the following terms:
 i) Environmental Audit
 ii) Environmental Management System
 iii) Environmental Impact Assessment
 iv) Environmental Monitoring

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- c. Explain the following terms:
 i) Environmental Management System
 ii) Environmental Audit
 iii) Environmental Impact Assessment
 iv) Environmental Monitoring

Evaluation

- d. Explain the following terms:
 i) Environmental Management System
 ii) Environmental Audit
 iii) Environmental Impact Assessment
 iv) Environmental Monitoring

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- e. Explain the following terms:
 i) Environmental Management System
 ii) Environmental Audit
 iii) Environmental Impact Assessment
 iv) Environmental Monitoring

Evaluation

- f. Explain the following terms:
 i) Environmental Management System
 ii) Environmental Audit
 iii) Environmental Impact Assessment
 iv) Environmental Monitoring

2 of 2

Note:- Answer any full five question, choosing one full from each module.

Module -1

- 1a. Enumerate the various Environmental Management Principles and Explain any two principle.

Ans:- The International Chamber of Commerce (ICC) is a non-government organization serving world business. Its membership extends to more than 130 countries and including thousands of business organisations and enterprises with international interests.

ICC developed a Business charter for Sustainable development which set out 16 principles for Environment Management. The charter covers Environmentally relevant aspects of health, Safety and product Stewardship. Its objective is that the widest range of enterprise community themselves to improving their Environment performance in accordance with the principle to achieve SDG [Sustainable development Goals].

The 16 principles set out in the charter are as follows.

- 1) Corporate priority
- 2) Integrated management
- 3) Process of improvement
- 4) Employ education
- 5) Prior Assessment
- 6) Product & Services.
- 7) Customer advise
- 8) Faculty & operations
- 9) Research
- 10) Contract & Suppliers
- 11) Emergency preparedness
- 12) Transfer technology.
- 13) Contribute to the common effect.
- 14) openness to concern.
- 15) Compliance & reporting.

i) Comparative priority

To recognise environmental management as among the highest corporate priorities and key determinant to sustainable development to establish policies, programmes and practices for conducting operation in an environment sound manner.

ii) Integrated Management.

To integrated these policies, programmes and practices fully into each business as an essential element of management in all its functions.

Q6. Enumerate various drivers and barriers for sustainable development (any five).

Ans:- Barriers to adopt Sustainability production and consumption

- * Lack of resource
- * Lack of awareness
- * Lack of Staff training and skill.

Drivers to adopt Sustainability practices.

- * Stakeholders pressure
- * Competitor pressure
- * Regulatory Pressure

i) Lack of resource:

Many companies do not invest in Sustainability practice due to its lack of resources. resources may not be big issue for big Corporatives but for small & medium Enterprises lack of resources is the main issue.

ii) Lack of awareness:

Lack of awareness has been identified as another main barrier for adoption of Sustainability practices. Besides thus if people are aware they resist to change.

c) lack of staff training and skill

Most of the industries are facing the problems of staff training and lack of skill. Most of industries have old staff who doesn't have adequate skill that are necessary to use the sustainability practices.

d) Stakeholders pressure.

Sustainability is related in the context with stakeholders and is defined by owner values. Most of the stakeholders believe that organisation should adopt those policies & acts that will show norms and values of the organisation. Many stakeholders should pressure their enterprises.

e) Competitor pressure:-

At most of companies are giving keen importance to environment protection they are adopting sustainable practices. They will make/pressure competitor company to adapt sustainable practices.

OR

Ques:- Explain abatement of pollution. List out the major activities initiated under the various scheme on pollution abatement.

Ans:- Stewardship of Environment refers to protecting the environment through recycling, conservation, regeneration and restoration.

It means taking responsibility for our choices.

The responsibility for environment quality should be shared by all those whose action affect the environment. Environment Stewardship embodies the concept of green office, a green school or green house which is conceptualised as cleaner and better at it.

a) Ecological :- using non toxic, recycled, environmental friendly products and supplies

b) Efficient :- using as little energy and other resource as possible and putting off the smallest amt of waste as possible.

c) healthy :- will generate as little visual, noise & physical pollution as possible.

Major activities Initiated Scheme

- * A multidisciplinary, interdisciplinary or holistic approach.
- * A goal of sustainable development
- * It concerned for limits, hazardous and potentials
- * It supports polluter pays principles
- * Support for long term not just short term planning
- * Prior assessment of environmental impacts.

Q b) Enumerate the Business charter tools for sustainable production & consumption (Any ten)

The International Chamber of commerce (ICC) is a non-governmental organization serving world business

1) Corporate priority

To recognise environmental management as among the highest corporate priorities and as key determinant to sustainable development to establish policies, programme and practices for conducting operations.

2) Integrated Management.

To integrate these policies, programme & practice fully into each business on an operational elements of management all its function.

c) Process of improvement :-

Continuously improve corporate policies, programme and Environment performance, taking into account technical development, Scientific understanding consumers needs and Community Expectations.

d) Employ Education:-

To Educate, train and motivate Employees to conduct their activities in an environmentally responsible manner.

e) Prior assessment.

To Assess environmental impact before starting a new activity or project and before decommissioning a facility or leaving a site.

f) facilities and operation.

To develop, design and operate facilities & conduct activities taking into consideration the efficient use of Energy and materials.

g) Research :-

To conduct or support research on the impact of raw materials, products, process, emission and wastes associated with enterprise and on the means of minimizing such adverse impacts.

h) Precautionary approaches.

To modify the manufacture, marketing or use of products or services or the conduct of activities, consistent with scientific and technical understanding.

i) Transfer of technology.

To contribute to the transfer of Environment bound technology and management methods throughout the industrial & public sectors.

Module - 2

3a. Enumerate the various Environmental Quality Objectives.
Briefly explain any two.

Ans.

- 1) Reduce climate impact
- 2) clean Air
- 3) Natural Acidification only
- 4) A non toxic environment
- 5) A protective ozone layer
- 6) A safe radiation environment
- 7) zero eutrophication
- 8) flourishing lakes and streams.
- 9) Good quality Groundwater.
- 10) A balanced marine environment, flourishing.
- 11) Thriving wetlands.
- 12) Sustainable forest.

1) Clean Air

The air must be clean enough It should not cause risk to health or to animals, plants or cultural assets.

2) Natural Acidification only:-

Acidifying effects of deposition on land and disposal onto water bodies must not exceed the limit that can be tolerated by soil and water deposition of acidifying substances must not increase the rate of corrosion of materials or cultural artifacts and buildings.

b.
Distinguish between

(i) Pollution control & pollution prevention

(ii) Concentration & mass standards.

ii) Concentration is the mass of a pollutant in a defined volume of water, ex: mg/l, mg/m³

Load is the amount of pollutant that is discharged into a water body during a period of time or amount of pollutant produced after processing definite amount of substance.

Ex:- 1 kg/1000 tonnes of substance produced
 > tons of sediment per year.

(iii) Pollution control.

Pollution control focus on measures taken after what have been produced to limit the damage they may cause. It is often more difficult and expensive to control pollution if it has been released into environment.

(iv) Pollution prevention.

Pollution prevention means avoiding or minimizing the generation of waste that produce pollutants, thereby restricting their release into the environment.

any practice that reduces, eliminates or prevents pollution at its source. Pollution prevention is also known as Source reduction.

Q8 Explain Environmental performance Evaluation process us PDCA Cycle.

Ans. Environmental performance evaluation is a management tool that provides manage with information about how well an organization Environmental Systems is performing and whether the aims of its Environmental Policy are achieved.

EPA is a useful auditing tool for assessing whether Environment aspects, objectives, targets and other Environmental performance Criteria are being met.

EPA is an ongoing process that ensure any changes to an organization activities, products and Services that might effect environmental performance are accounted for its EMS.

The main difference b/w EPE and Environment Audit is that EPE is going process that tracks performance trends over time unlike an environmental Audit which is summary of the EMS performance at a given point in time.

The indicators which are used for environmental performance Evaluation are called "Environmental performance indicators" EPI. Environmental Performance indicators provide information that helps Evaluation and decision making within Organization that engage in environmental efforts.

Purpose of EPI :-

Environmental Performance indicator provide information that helps Evaluation and decision making within organization that engage in environmental efforts.

Objective of EPI :-

To Measure and evaluate Environmental burdens, Environmental Problems that need to be solved and outcome of Environmental efforts Comprehensively in order to promote Environmental activity.

1.b. Briefly Explain

- (i) cleaner production and clean technology
- (ii) Zero technology for discharge.

Ans.

Cleaner production is preventive, company specific Environment Protection Initiative, it is intended to minimize water & Emission and maximum product output.

By analysing the flow of Nutrients and energy in a Company. One tries to identify options to minimize water & environment out of industry process through Source reduction Strategies.

Improvements of organisation & technology help to reduce
or Suggest better choices in use of material and energy
and to avoid water, wastewater generation and gaseous
emission and also water heat & noise.

In accordance with the United Nation Environment Programme cleaner production is under to mean

The continued application of an integrated Environmental prevention Strategy is process, product and Services

Zero discharge technology

Zero liquid discharge (ZLD) is an Engineering approaches to water treatment where all water is recovered and contaminants are reduced to solid waste.

ZLD technology include pre-treatment & evaporation of the industrial effluent until the dissolved solids precipitate as crystals. These crystals are removed and dehydrated with a filter press or centrifuge. The water vapour from evaporation is condensed and returned to the process.

Module - 3

5a.

Enumerate the benefits and barriers in implementing ISO 14001 in an organisation.

Ans:-

The ISO 14001 Standard defines EMS as that part of the overall Management System which includes.

The organisational structures planning activities responsibility, practices, procedures, process and resource for developing implementing activities, reviewing and maintaining the Environmental policy.

Benefits of ISO 14001 certification.

- * EMS certification is of the Management System itself
- * Company can develop EMS but will not be certified however most companies that develop EMS do indeed certify it.
- * Certification does not generate instant result.
- * It levels the playing field of international trade bringing more competitors to the scene. This means companies Certified to ISO14001 have market access all over the world. In addition the employment would be created in the home country thereby declining the unemployment thus poverty.
- * Insurance Companies these days find it easier transacting business with companies that have effective EMS like ISO14001
- * The Standard also provides an effective means of technologies development as well as its transfer to the sectors of the industry or the organisation.

b.
Ans:- Explain EMS and EMAS.

EMAS (Eco-Management and Audit Scheme).

EMAS is a management tool for companies and other organisation which they can use to evaluate, report and improve their environment instrument development by European commission.

It is one of the voluntary instruments of environmental protection, it is positivity motivates organisation to responsible approach and to improving its environment performance beyond the legal requirement.

It also publish information in the form of individual environmental statement.

EMS is proactive approach of the company to monitoring control and gradual reduction of the impact of the activity of the organization on the environmental

It is designed for the organization functioning in the private sector as well as for the organization state and public sector.

EMAS, however, Extends the ISO 14001 System especially in term of transparency when organization with an established system according EMAS are obligated to publish Environmental Statements and hold open discussion with public and other interested parties.

Q6a. Write Explanatory notes on ^{or}

- (i) Initial Environmental Review (IER)
(ii) Management Review (MR)

Ans

(i) Initial Environment Review (IER)

- It is a first step in creating an EMS to perform an initial Environmental review.
- It tells where organisation is and creates a road map for organisation.

There are four main areas.

- * Review previous environmental issues.
- * Consider any regulations which have operational impact.
- * Identify and evaluate possible Environmental issues in Environment.
- + Outline current operations and how it is managed also consider indirect impacts.

(ii) Management Review (MR)

Periodically review EMS with an eye to continual improvement.

Maintain & manage records of EMS Performance.

Periodically verify EMS is operating as intended.

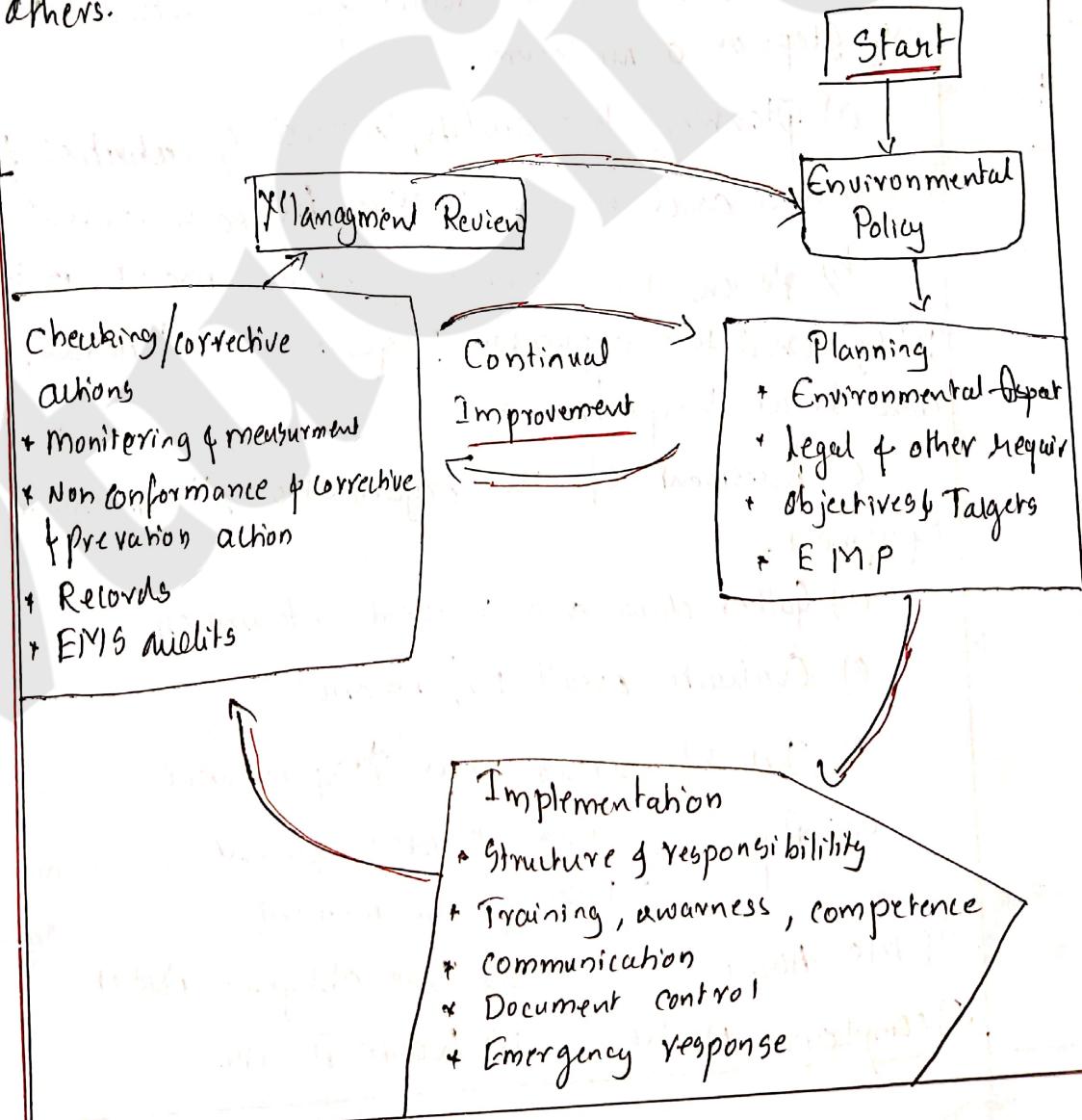
b. Write a note on Environmental aspect and impacts within an organisational setup.

Ans.
ISO 14001 is widely accepted internationally standard for EMS that forces on continual improvement.

Companies may asked to demonstrate conformance with ISO 14001 as condition of doing business in some markets.

The standard is consistent with the key elements found in many EMS models, including European Union's Environment and Audit Scheme.

EPA's Performance track & the code of Environmental Priorities for federal agencies among others.



Module - 4

7a.

Write a process flow diagram for the management of audit programme as per ISO - 19011.

Ans:-

What Systematic Documentation process towards obtaining Evidence and objective Evaluation for determination of Compliance of framed Criteria's

Rational of Audit's

- * Opportunity towards improvisation.
- * Application of best practice.
- * Corrective and preventive action implementation.

Process:

The Environmental Audit process includes the following steps as a minimum.

- a) Planning the audits, including activities to be conducted and responsibilities for each activities.
- b) Review the company environment protection policy and the applicable requirements, federal, state and local requirement
- c) Assessment of the organisation, its management, equipment.
- d) Gather data and relevant information.
- e) Evaluate overall performance.
- f) Identify areas need performance.
- g) Report findings to management.

Types of Environment

- | | |
|---------------------|------------------------|
| 1) EMS Audit | 3) Due diligence Audit |
| 2) Compliance Audit | 4) Waste Audits. |

Q.5. Enumerate the contents of Environment Statement (Form-V)

Ans:- It is the process of Self-inspection improvement in process and reduction in waste over last year.

In today's world every industry is optimizing their source.

Equipments, process to face increasing competitions are forced to minimize environmental pollution

So there is a need of pressure on pollution contributing industries to optimise their production by improving production technologies.

The only mandatory process in environment Statement is to fill up the form-V and submit it to (PCB). Pollution Control Board.

Information collected through ES (Form V)

In ES every industry should provide information on pollution, consumption of raw material, water, pollutant discharged in environment, Solid & hazardous waste with their treatment procedure / process.

ES (Form V) filling process.

Part A :- Basic information about company like name,

Address, industry category.

Part B :- This part is for comparison of water & raw material consumption.

Part C :- This part is to measure pollutants discharged to environment through medium Air & H₂O.

Part D :- This part to measure hazardous waste from process

Part E :- This part is to measure Solid waste generated by industry.

Or

- 8a) Write a note on Waste minimizing planning in an industry.
- Ans:- Waste audit helps us understand amount and characteristic of waste by knowing which type of waste is generated by an industry, a waste can be minimized by
- + waste reduction
 - + waste diversion.

→ Waste reduction has 3 possible options to reduce waste.

a) Reduce :- if there is any ways to stop certain wastes from being produced in the first place.

b) Recycle :- finding creative purposes for waste generated rather than dumping in a landfill.

c) Recycle :- Process of Converting waste materials into new materials and object.

Ex:- fibreglass made from glass bottles.

→ Waste diversion is process of redirecting materials to reprocessing facilities such as recycling and composting instead of landfills. With waste diversion, its only clear way to process in waste management by monitoring the landfills over the year.

→ Waste audits help with waste diversion because when completing a waste audit, waste products are separated into certain groups.

Waste audits, waste diversion and waste reduction all are important factors for industry to consider when creating a waste minimization.

8 b) Explain briefly:-

- (i) Non-conformity ii) Roles and Qualifications of Auditors.

Ans: (i) Non-conformance.

Non-conformance can be defined as failure to conform or non-confirmation of specified requirements. Basically whenever an organization does not satisfy the requirements their own procedures then that would be considered as non-conformance.

In other words non-conformity can be considered as "Deviations from standard procedure of EMS".

* ISO 14001 4.5.2 deals with requirements for addressing correcting and preventing non-conformance with EMS.

* Based on severity of non-conformance, they are generally separated into categories.

 a) Major non-conformance

 b) Minor non-conformance.

(ii) Roles and Responsibilities of Auditors.

A) Auditors may be
 (i) Internal Auditor one who performs partly
 (ii) External Auditor one who performs partly

Role of Auditors:-

Environmental Audit

* Selecting and managing Audit team.

* Reviewing the operations of organisation being Audit & determining how environment issue being handled.

* Gathering data on the business operation through on-site inspections, document review, staff interviews.

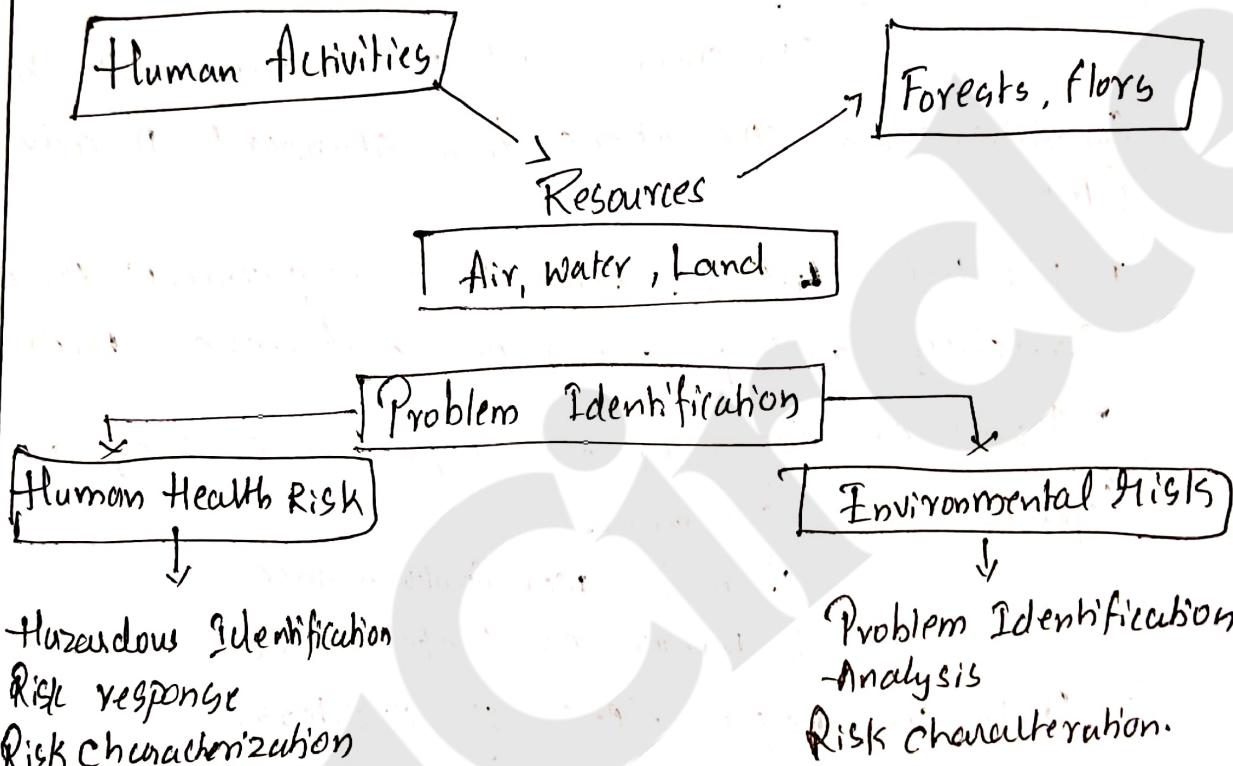
* Check records for government permit and requirement Safety Standards.

* Assist in the development of Environment Management Plan.

MODULE - 5

Qn) Briefly discuss the applications of EMS and waste audits.

Ans: The development of industrial production, implementation of new technologies using of growing number of dangerous substance brings remarkable risk tightly related to health and environmental threats.



Applications of EMS

- * Receiving the organisation's environmental goals
- * Establishing Program's to meet these objectives & targets
- * Ensuring employer's environmental awareness
- * Development of industrial production
- * Technology growing for marketing value.
- * Human Activities for betterment.
- * Health and wealth of the team Management

a)

Discuss pollution prevention opportunities in pulp paper & sugar mill.

Ans:-

The Pulp and Paper industry companies that used wood as raw material and produce, pulp, paper and other cellulose based products. Pulp and paper industry are categorised into 3 sectors.

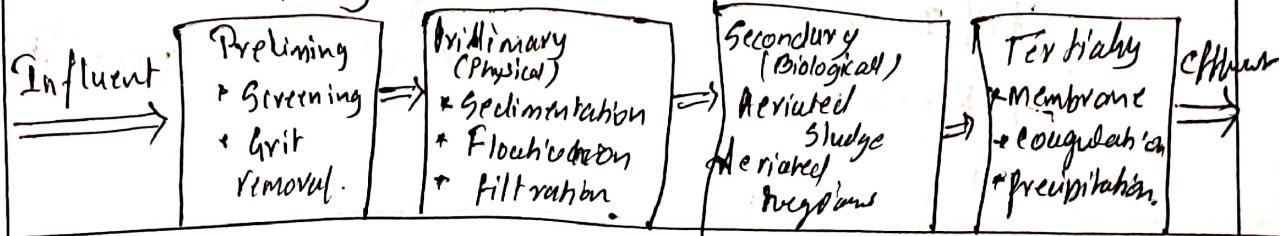
Waste audit will help to understand what type of water will be generated in different process. Some water generated in paper and pulp industry as follows.

- a) After raw material production:- Waste water containing type of suspended solids. BOD
- b) After pulping Section:- Waste water containing high BOD + COD, VOC, etc will be generated.
- c) After pulping Section Bleaching:- Waste water containing aromatic chlorocompounds, dissolved lignin. high concn will be generated.

An effective waste minimization method, reduces cost liability, regulatory burden of hazardous waste management. Furthermore, management methods including:

- * Production, planning & frequency.
- * Process adjustment and/or modification
- * Raw material replacement.
- * House keeping waste Segregation & Separation

* Recycling



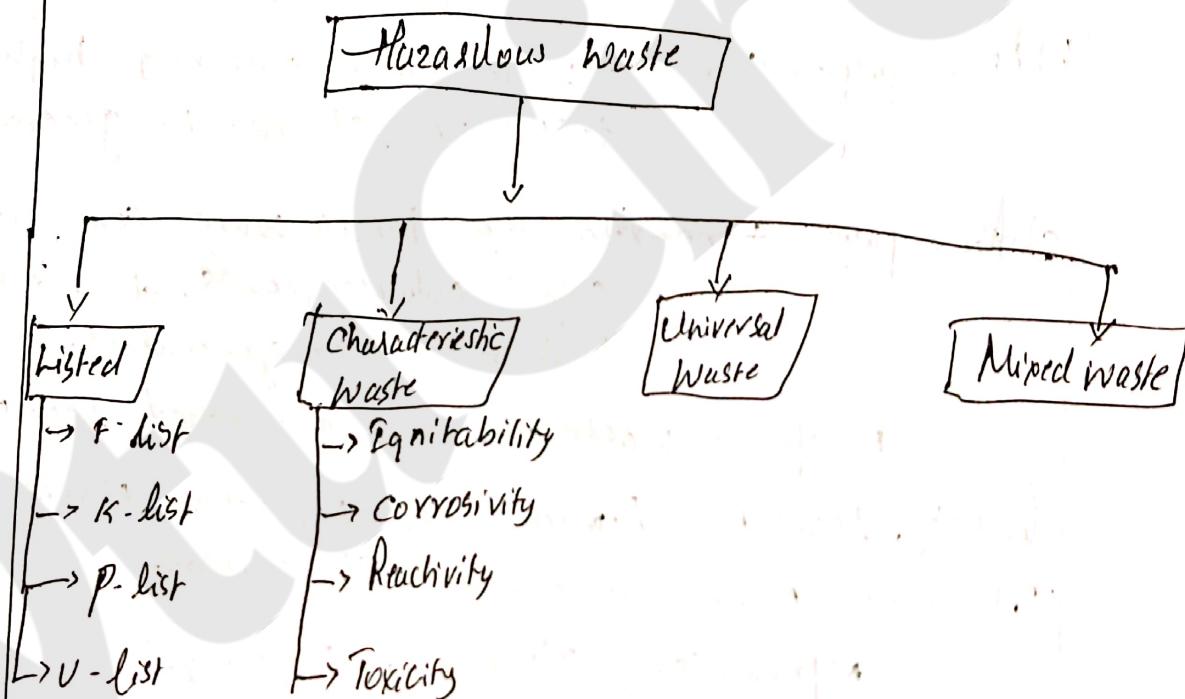
10.b Write a note on hazardous waste classification and characteristics.

Ans:-

Hazardous waste often vary from one another. The EPA has identified four main categories in which hazardous waste can be classified.

+ with each categories comes different risk and disposal methods. When left inappropriately treated or managed, these wastes can have very harmful effect on the environment.

The four identifiable classification are as follows.



Staff Incharge

Prof. Rakesh P

25/2

~~Mr. Rakesh P~~
29/3/2022

~~Dean Academic~~
29/3/22