INTERNAL ASSESSMENT TEST – III Dec 2024

Sub:	Environment Protection and Management							Code:	21CV753
Date:	14 /12/24	Duration:	90mins	Max Marks:	50	Sem:	VII	Branch:	**CSE, AIML, AIDS, EEE**

Answer all questions

		Marks	CO	RBT
1	Write a short note on waste minimization planning in an industry.	10	CO4	L2
2	Define an audit. Explain the principles of auditing.	10	CO4	L2
3	Explain EMS pollution prevention methods adopted in an electroplating industry.	10	CO4	L2
4	What is a waste audit? How do you plan a waste audit in an organization?	10	CO5	L2
5	Explain the identification of hazardous waste source and its characteristics.	10	CO5	L2

IAT-3

Answers:

1) Waste Minimization planning in an industry involves the following steps:

(1). Identify the wastes your facility creates:

→ As a first step, run a waste audit & gather information about which department produces which categories of waste and weigh the highest category.

(2). Identify the waste stream:

→ Identify whether the wastes are hazardous or non-hazardous. Categorize the wastes based on whether they are solid or liquid.

(3). Establish a Waste Management Team:

→ Create a waste audit team with atleast five members who can be taken on the basis of Substainability Committee.

(4). Assess your current Waste Disposal Methods:

→ This may include:

- Labelling of wastes & recyclables.

- Putting wastes to be disposed & the recyclables in different boxes.

(5). Create your Waste Hierarchy:

- Reduce: This includes reducing the resources and raw materials that produce wastes.
- Recycle: This includes using of the byproducts as raw materials to produce new products.
- Reuse: Reusing the products.
- Recover & Disposal.

(6). Select Waste Management Partners:

→ The company has to collaborate with the external & internal parties for efficient waste management.

(7). Set targets for Waste Reduction:

→ Before considering new waste management technologies we need to measure and analyze the previous technologies

(8). Create a Waste Management Action Plan:

→ An action plan includes the measure & reusing water, recyclables & the

amount of byproducts produced.

(9) Train Employees on New Procedures:

→ Facilities has to train the employees on new methods that are implemented by conducting sessions.

(10) Track on progress & monitor for adjustments

→ Over time keep the track of progress of your goal and add on if any adjustments are required to achieve your goal.

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2) Environmental audit is essentially an environment management tool that provides a measure of effects of activies on the environment against set targets & standards.

→ Environmental audit helps to:

- investigate
- identify
- understand.

- It helps to improve the existing human activities that have adverse effects against the environment.

→ ISO 19011 defines 7 principles to define that auditing is a effective

& reliable tool, supporting the management to get a reliable & actionable information so as to improve its performance.

(1). Integrity: The foundation for professionalism:

→ Auditors and the audit programme managers have to perform their work honestly and should be ethical & responsible for:

- Understand the audit only when competent
- Audit should unbiased.

(2). Fair presentation: The obligation for report is truthful & accurately.

→ The documents of evidence, conclusions, written reports should be truthful & accurately showcasing the necessary details.

- The disagreements between auditors, obstacles also has to be included.

(3). Due Professional Care: The diligence & judgement in auditing:

→ Auditors has to exercise the due

professional care for the auditor in accordance with the confidence of the auditee and in recognition of the importance of the task.

- It is also responsible for providing reasonable judgements.

(4). Confidentiality: security of Information:

→ It is the responsibility of the Auditor to maintain the confidentiality of the information that they are dealing with.

- The information should be secure & protected incase of sensitive documented information.

(5). Independent: Auditing should be impartial & objectivity:

→ The audit should not interfere or should be independent of the activity being audited at the further most extent.

- The internal audits should be independent of the functions involved.
- Smaller business cannot give a true distinction for independence of auditing.

(6) Evidence-based approach.

(7) Risk-based approach.

3). Plating involves combination of a variety of process and has various technologies implemented instead of traditional practices.

→ EMS pollution prevention methods adopted in an electroplating industry are:

(a). Change in Process:

- Replacing cadmium with high-quality corrosion resistant zinc. Use of cyanides alternatives of zinc wherever possible. Instead of cadmium we can use bright-colour zinc chloride, alkaline baths or other alternatives. Note that the cyanide alternatives may release heavy metals & are toxic.
- Replace hexavalent chrome with trivalent chrome.
- Regeneration of acids and processes.
- Instead of organic surface-cleaning agents use water based surface-cleaning agents as they are non-toxic.

(b). Reduction in dragout & Wastage:

- Maintainance of drip wholes in the bath solution containes for efficient dragout.
- Use of fog sprays for drilling.
- Atleast allow 10 to 20 seconds for dripping.
- Maintain viscosity, temperature & density.

(c). Minimizing waster Consumption in Rinsing System:

→ This will allow 90% more effective rinsing system than the traditional methods.

- Agitation of water & work pieces for efficient rinsing.
- Multiple counter current rinses.
- Recycling of rinses.
- Spray rinses. Managing the water consumption.
- Recycling of rinses from filteration and sedimentation process.
- Recycle and Analyses of the rinse systems.

- Clean the slabs in between to avoid contamination.

4). Waste Audit is a physical analysis of waste composition to provide a detailed understanding of problems, identifying potential opportunities and giving a detailed information of your waste composition.

→ A waste audit will mainly help to:
- Establish a benchmark or baseline data
- Identify waste diversion opportunities
- Identify source reduction opportunities
- Verify waste pathways.
- Detailed information on waste generation

- Steps involved to plan a waste audit in an organization includes:

→ Step-1: Assemble a Audit Team & Fix a Date:
- Establish a team of atleast five volunteers as a waste audit team for that company.
- Plan a week to perform a waste audit providing the actual trash

output. The week planned should not have any special events and almost all the staffs should be present in that week.

Step-2: Determine the Waste Categories:

→ Just before the 'Waste Audit Week', categorize the wastes produced by the organinization:

- Categories of waste:

→ Plastic bottles
- singage.
- Food packages
- beverages
- Aluminium
- Cardboards.

Step-3: Gather your Tools:

- Stock up on the supplies required to perform the waste audit safely:
- An open area for waste segregation.
- Tongs for each volunteer.
- Face masks for each volunteer
- Gloves for each volunteer.
- Labelled boxes for waste categories
- clipboards for recording the findings.

step-4: sort the Trash:

→ The accumulated trash should be sorted as wastes to be disposed and recyclables.

- Weights the wastes that are categorized to be disposed
- Weigh the wastes that are categorized as recyclables.
- Auditors should be cautious to not mix the waste with the recyclables.

step-5: Analyze your results:

(a). Calculate the Waste diversion rate percentage

- Result = trash + Recyclables.
- Divide the result to get percentage by 100.
- The above obtained percentage gives the waste diverting from the landfills.

(b). Categorize the waste:

- Which category is highest?
- Is the highest category differing b/w the departments?
- Keep a track of the waste audit.

step-6: Next after the Waste Auditing.

- Hire a recycling specific rate for your company if it does not have.
- Set goals to achieve good recycling rates.
- Determine the dumpster size and the frequency of landfill matches with the company or not.
- Instead of paper towels use cloth napkin for dining.
- Instead of paper towels use electric hand dryers in the restrooms.

5) Hazardous waste can be produced ranging from household activities to industrial processes. Because of their quantity, chemical characteristic and adverse effects they are hazardous.

- They can increase mortality rate and also affect the human health and the environment.
- Though identification hazardous waste is confusing, based on the following criteria under (EPA-2005) we can categorize it as follows:

(a). Identification of hazardous waste source:
(1). F list (non-specific sources)
(2). K List (source specific)
(3). The P & U List

(b). Based on characteristics:
(1). Flammability / Ignitegity
(2). Corrosivity.
(3). Reactivity.
(4). Toxicity.

→ The F list specifies the hazardous wastes that are produced from industrial processes and are non-specific sources.
• There are 7 subdivisions:
→ Spent solvent wastes.
→ Wood preservation waste.
→ Multi leachate waste
→ Petroleum waste water treatment Waste.
→ Wastes from electroplating & other processes
→ Dioxin-based waste.
→ Wastes from specific chlorinated aliphatic hydrocarbons.

→ The K-list specifies the specific sources wastes from industries.
• The subdivisions include:
→ Wood preservation

- Inorganic pigment manufacturing
- Organic chemical manufacturing
- Inorganic chemical manufacturing
- Explosive manufacturing
- Petroleum Refining.
- Primary Aluminium manufacturing
- Secondary Iron & Steel Manufacturing.
- Ink formulation.
- Coking of coal for steel & iron production.

→ The P & U list are pure-commercial wastes generated that are unused.

- The waste is categorized under this if:
- It has a chemical that is unused.
- The chemical waste is present in the P & U chemicals list.

→ Characteristics:

(1). Flammability:

→ These include the wastes that supports combustion & catch fire.

(2). Corrosivity:

→ The acids or alkalines that can

dissolve flesh or metals or any other materials and when transported can cause acute damage to other materials. Example: Sulphuric acid from automobiles.

(3). Reactivity:

→ Some wastes are reactive, i.e. when exposed to water, heat or any other chemicals can be exploded and release toxic fumes.

(4). Toxicity:

Leaching of the environment when the industrial by products are released into ground water, any other land surfaces thereby making them toxic.