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Internal Assessment Test 1 – May 2022										
Sub:	PLCM				Sub Code:	17ME835	Branch:	ME		
Date:	14.05.2022	Duration:	90 min's	Max Marks:	50	Sem / Sec:	8 th B		OBE	
<u>Answer any FIVE FULL Questions</u>								MARKS	CO	RBT
1a.	Define PLM? List and explain different phases of product life cycle?						(10)	CO1	L1	
2a.	What is a PLM Strategy? Explain.						(10)	CO1	L2	
3a.	List and Explain benefits of PLM?						(10)	CO1	L1	
4a.	What is engineering design explain?						(10)	CO2	L1	
5a	With a neat sketch explain Product design process?						(10)	CO2	L2	
6a	Sketch and explain recovery strategies of end-of-life products.						(10)	CO2	L1	

CI

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HOD

IAT-1 Solutions.

1. Product lifecycle management makes it possible to command the whole lifespan of a product and the information connected with it. Efficient product lifecycle management enables companies to compete successfully in international and global markets. A PLM system is a collaborative backbone allowing people throughout extended enterprises to work together more effectively. Operational efficiencies are improved with PLM because groups all across the value chain can work faster through advanced information retrieval, electronic information sharing, data reuse, and numerous automated capabilities, with greater information traceability and data security. This allows companies to process engineering change orders and respond to product support calls more quickly and with less labor. They can also work more effectively with suppliers in handling bids and quotes, exchange critical product information more smoothly with manufacturing facilities, and allow service technicians and spare part sales reps to quickly access required engineering data in the field.

2. A product lifecycle management or PLM system – what is usually meant by the term PLM – is ideally an information processing system or set of IT-systems that integrates the functions of the whole company. This integration is done through connecting, integrating and controlling the company's business processes and produced products by means of product data. At the practical level, the adoption of PLM is still too often restricted to only certain areas of certain business processes, such as product design and development. Kenneth McIntosh has proposed that PLM can be the operational frame of CIM (Computer Integrated Manufacturing) – one of the isms of industrial business. In other words, it is a system or set of systems, which integrate the functions of the whole company with the help of information technology. PLM is above all a connecting technology, not an individual technology islet or information processing system like a CAD (Computer Aided Design) system. A specialized IT-system can be very efficient in its own area but such systems usually cause bottlenecks elsewhere in the company's dataflows and at the level of practical implementation in corporate IT- systems. The most important business processes, the product process and the order-delivery process, in manufacturing industry are cross-functional and cross-organizational. The task of PLM, in one sense, is to provide the necessary conditions for Connecting separate information data systems, processes and automation islets. Additionally, PLM should command a wide variety of information systems and thus give birth to integrated totalities. Commanding the totality of various processes brings considerable value to companies by seamlessly integrating information from organization-wide processes using different information processing systems.

The essential elements of PLM are:

- Management of design and process documents
- Product structure (bill of material) management
- Central data vault (electronic file repository)
- Part and document classification and metadata ("attribute") management
- Materials content identification for environmental compliance
- Product-focused project task assignment
- Workflow and process management for approving changes
- Multi-user secured access, including "electronic signature"
- Data export for loading downstream ERP systems

3. PLM Benefits

PLM software delivers key benefits, which we'll explore below.

Reduce Risk. In a world of regulations, each industry has to comply with specific regulatory standards. ...

Increased Productivity. ...

Cost Management. ...

Accelerated Time to Market. ...

Increased Revenue. ...
Data Sharing. ...
Centralization. ...
Better Quality Product.

4. The engineering design process is a common series of steps that engineers use in creating functional products and processes. The process is highly iterative - parts of the process often need to be repeated many times before another can be entered – though the part(s) that get iterated and the number of such cycles in any given project may vary. It is a decision-making process (often iterative) in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation.

One framing of the engineering design process delineates the following stages: research, conceptualization, feasibility assessment, establishing design requirements, preliminary design, detailed design, production planning and tool design, and production. Others, noting that "different authors (in both research literature and in textbooks) define different phases of the design process with varying activities occurring within them," have suggested more simplified/generalized models – such as problem definition, conceptual design, preliminary design, detailed design, and design communication. A standard summary of the process in European engineering design literature is that of clarification of the task, conceptual design, embodiment design, detail design. In these examples, other key aspects - such as concept evaluation and prototyping - are subsets and/or extensions of one or more of the listed steps. It's also important to understand that in these as well as other articulations of the process, different terminology employed may have varying degrees of overlap, which affects what steps get stated explicitly or deemed "high level" versus subordinate in any given model.

5. Introduction Product design takes a long time and a great deal of effort. It is important to target the design programme to minimise time and costs and to plan for it to be successfully completed within allocated resources. Time is very much of the essence, the minimum compatible with optimal development. In a product design plan, there are many activities to be first recognised and then coordinated; some activities are worked in sequence, some in parallel. In particular, multidisciplinary activities are focused in the same direction and coordinated in time. The master plan coordinates the various people and their mini-projects in an overall time and resource plan so that the product design can be controlled. The plan begins with the product design specifications. These include a profile of the product characteristics as defined by the consumer, the structure and composition, safety factors, convenience and aesthetics, and also indicates the manufacturing, processing and storage variables and their effects on the product qualities. Many of these product design specifications start as general descriptions; product design and process development focuses them into definite, quantitative descriptions. In the design process, the product and process development are integrated so that at the end of the design stage there is a product with the optimum qualities, and a process to produce it. A great deal of time is lost if a food product is designed under 'kitchen conditions' and then has to be redesigned as the process is developed. In food product design: important marketing factors are consumer acceptability, competitive positioning, legal regulations, ethical requirements, environmental mandates and distributor requirements; important technical factors are raw material availability, ease of processing, cost, attainability and reliability of product quality, shelf life, equipment needs, human knowledge and skills; and important financial factors are costs of manufacturing and distribution, costs of further development and the investment needed. These are considered at various parts of the design so that at the end of the product design and process development they can all be included in the feasibility report for top management. The design process The design activities are grouped into steps: 'getting the feel', screening, ball-park studies, optimization and scale-up.

6. End of Life (EOL) is when a product reaches the end of its product life cycle and is consequently withdrawn from the market. It can be either completely pulled out from the market without substituting it or, in many cases, substituting it with a new edition. This could be due to a change in market demands, technology, competitive pressure, unprofitability, or the product has become obsolete and replaced by functionally richer technology. Once obsolete, the product is not sold, improved, maintained, or supported.

The following critical factors should be kept in mind while developing a product end of life plan-

1. Profitability and Marketability: The product with the lowest profit potential is often selected for an EOL Plan. However, a product may also be selected to give way to newer products with better technology or in a case when the product is not marketable.

2. Sustainability: The choice between Remanufacture, Repair/ Reuse, Disposal, and Recycle is often based on the impact the product may have on the environment.

3. Customer Loyalty: Come up with alternative solutions for customer retention. Maintain customer loyalty by ranking customers based on monthly recurring revenue. In case there is a repeatable pattern of happy and profitable customers, you have potentially identified the issue—and it might not be the product.

4. Technical Implications: The production process for the product needs to be considered, the technical implications of the selected product on the existing production line, available technology, and even the labour force.

5. Negative implications: Consideration should be given to the contractual or legal implications that come after the sale of the product has been stopped.

6. Government Policies: The selection of the product is significantly influenced by government policies regarding the product or the industry as a whole. For example, promoting the use of electric vehicles could affect the life cycle of petrol or diesel-driven vehicles.

7. Business objectives: The contributions of the product to the realization of the company's short and long-range objectives must be considered before selection.

8. Physical concerns: In case it's a physical product, the implications of discontinuing the product in terms of customer replacement support, inventory, returns, or channel partners.

9. Risks: Consider the risks associated with discontinuing the product, such as loss of customers or possibly creating retaliation on social media if customers are unhappy that you have discontinued the product.

Different types of product have different issues at the end of their life as follows: –

Physical product

- Management of inventory in the pipeline
- Reduction in price in case of excess inventory

- Increase in price to drive customers
- Maintaining spare parts of discontinued products.

Services

- Sales or service operation transition user data over to a new service or website
- Maintain old service or website for the existing user even after sales or enrolment stop

Software

- Upgrade protection pricing
- Developer bug fix and patch availability
- Compatibility with future products

Crisis management

- Overheating
- Chances of batteries blowing up
- Food or drug poison
- **Scope**

Reasons for discontinuing specific products

Cost-effectiveness or innovation

Communication of transition plans for discontinued products

- **Announcement of the start of the end-of-life program of the product**
- **Product details**

Details of the product or product line are being discontinued.

Details of the versions available and the versions that will be discontinued immediately or over a period of time

- **Parties affected by retirement**

Internal groups at the company

Resellers

Channel partners

Customers

- **Alternatives available**

Take over by another company,

New product launch,

Continue sale for a limited time,

Shut down product in near future

- **Announcement**

Date of discontinuance

Spare parts availability

Assistance in Upgrading versions,

Customer and Technical support options,

Compatibility,

Exchange or Upgrade Options