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# National Institute of Technology, Hamirpur (HP)

Department of Mechanical Engineering

Final Examination- Nov. Dec. 2022

Subject: Product Design and Development

Course Code: ME-451

Max. Marks: 50

Time: 3.0hrs

Class: B.Tech.

Semester: 7<sup>th</sup>

Note: Each Question carries equal Marks.

1. Attempt all the questions.

10 Marks

- (A) What is the need to design a Product?
- (B) How 'Product Design' and 'Product Development' are related terms?
- (C) How Product is developed through Sequential Engineering Design Method?
- (D) What is an AMF Organization? How product is developed through AMF Development Process?

2. Attempt all the questions.

10 Marks

- (A) Does Product Development Process remain same across the three types of Production Processes? Explain.
- (B) What relationship three types of layouts carry with the Product Development Process of an Organization?
- (C) Do customer needs affect Product Planning Process? Explain.
- (D) What is the need to assess the Quality of Industrial design? Explain various steps involved?

3. Attempt all the questions.

10 Marks

- (A) To increase profits, how an Organization manage "concept generation exercise" during Product Designing? Explain.
- (B) How does 'Product Demand' affect the Product Development Process?
- (C) Does "Competitor's performance" affect "Concept Generation Aspect" during developing the product? Explain.
- (D) How "Effective Product Architecture" leads to build the Brand Value of a product?

4. Attempt all the questions.

10 Marks

(A) Design for manufacturing (DFM) is a development practice emphasizing manufacturing issues throughout the product development process. Provide a set of DFM guidelines for a computer manufacturer.

(B) Today there are several technologies able to create physical parts directly from 3D CAD files (e.g., stereo lithography and selective laser sintering). How might a product development team use such rapid prototyping technologies during the concept development phase of the product development process? State with help of example how these technologies facilitate identifying customer needs, establishing specifications, generating product concepts, selecting product concepts, and/or testing product concepts?

5. Attempt all the questions.

10 Marks

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(A) What do you mean by robust design? State the importance of robust design process in product development process. How you can integrate robust design process activities in the front-end process of the product development process? Suggest an approach based on design of experiments (DOE) to develop robust products.

(B) What are the types of intellectual property relevant to product design and development? Draft a claim and also draw a logic diagram of two claims for the patent of a device for mounting a telephone or for an apparatus for cooking