

# Exam Questions 2021-22 with Sample Answers

## QUESTION 1

a) Define the term of prototyping in the new product development process.

### Sample Answer

- Prototyping is the process of developing an approximation of the product along one or more dimensions of interest

or

- Prototyping is the process of quickly putting together a working model (a prototype) in order to test various aspects of a design, illustrate ideas or features and gather early user feedback

or

- IEEE defines prototyping as “ A type of development in which emphasis is placed on developing prototypes early in the development process to permit early feedback and analysis in support of the development process.”

b) Explain the three phases of prototyping.

### Sample Answer

- **Alpha** prototypes are typically used to assess whether the product works **as intended**; so they are usually built with production-intent parts
  - These are parts with the same geometry and material properties as intended for the production version of the product
  - They will look similar to and perform the basic functions of the product
  - They are not necessarily fabricated with the actual processes to be used in production

Alpha prototypes are tested to determine whether a) the product will work as designed, b) the product satisfies the key customer needs

- **Beta** prototypes are usually built with parts supplied by the intended **production** processes, but may **not** be assembled using the intended final **assembly** process
  - Beta prototypes are extensively evaluated **internally** and are also typically tested by **customers** in their own use environment
  - The **goal** for the beta prototypes is usually to answer questions about **performance** and **reliability** in order to identify necessary engineering changes for the final product
- **Pre-production** prototypes are the first products produced by the entire **production process**
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c) Explain the uses of prototypes in the new produce development process.

### Sample Answer

There are four main uses of prototypes:

#### 1. Learning

- Answering questions about performance or feasibility , such as
  - “Will it work?”
  - “How well does it meet the customer needs?”
  - For example, a proof-of-concept model

#### 2. Communication

- Demonstration of a product to get **feedback** from all stakeholders
  - e.g. top management, vendors, partners, extended team members, customers and investors
- A **physical**, tactile, 3D representation of a product is much easier to understand than a verbal **description** or even a **sketch** of a product
  - e.g. 3D physical models of style or function

#### 3. Integration

- Prototypes are used to ensure that **components** and **subsystems** of the product **work** together as expected
- **Comprehensive physical** prototypes are the most effective as **integration** tools in product development projects because they require the **assembly** and physical **interconnection** of all of the parts and subassemblies that make up a product
- The integration of the prototype forces **coordination** between different **members** of the product development team
- For example: alpha or beta test models

#### 4. Milestones

- Provide goals for the development team’s **schedule**
- Milestone **prototypes** are defined in the product development project **plan**
  - ‘Go/no go’ decisions can be at these points
- The **number** of such prototypes and their **timing** is one of the key elements of the overall **development plan**
- As a **base case**, the development team should consider using alpha, beta and pre-production **prototypes** as milestones
  - e.g. first testable hardware

## **QUESTION 2**

a) Define the concept of Intellectual Property.

### **Sample Answer**

Intellectual property, often known as IP or IPR, is an intangible asset created by human intellectual or inspirational activity. It allows people to own their creativity and innovation in the same way that they can own physical property.

b) One form of intellectual property protection is copyright. Describe what sort of intellectual property copyright can protect and what form of protection it gives.

### **Sample Answer**

- Provides exclusive rights to creative individuals for the protection of their literary or artistic productions
- Includes computer software
- Copyright protection is automatic and there is no registration or other formality
- However, you should mark anything you want to copyright with the © symbol, the name of the copyright owner and the year of publication
- Copyright may exist in any of 9 descriptions of work, these are grouped into 3 categories:
  - Original literary, dramatic, musical and artistic works
  - Sound recordings, films, broadcasts and cable programmes
  - The typographical arrangement or layout of a published edition.

c) A patent is a well-known intellectual property for new and improved products and processes. Discuss the benefits and limitations of using patents from the perspective of a product developer.

### **Sample Answer**

#### Benefits:

- Only the owner (individual or organisation) can benefit from the invention for the duration of the patent. In the US and Europe, this duration is 20 years.
- Patent owners can commercially exploit their ideas themselves or they can charge other organisations to use their patent – identifying an alternative source of income.
- This is particularly useful where an organisation does not have the resources or market knowledge to exploit the invention associated with the patent.
- Patent databases can be a good source of information on what competitive organisations are working on.

#### Limitations:

- It is up to the owner to defend a patent in the courts if there is any infringement.
- This can prove very expensive and often impossible for a small business.
- Annual fees are needed to keep the patent in force.

### **QUESTION 3**

a) Describe the five alternatives that are open to the firm when competing through products

#### **Sample Answer**

**Product proliferation:** The same firm produces several brands of the same type of product. This will leave very little room for new firms to compete.

A **value proposition** refers to the value a company promises to deliver to customers should they choose to buy their product. A value proposition is also a declaration of intent or a statement that introduces a company's brand to consumers by telling them what the company stands for, how it operates, and why it deserves their business.

**Design:** Ergonomics (Ease of use, Ease of maintenance, User interaction with the product, Novelty of the user interaction needs, Minimum knowledge of using it safely) Aesthetics (A customer's perception of a product is in part based upon its aesthetic appeal. An attractive product may be associated with high fashion and image and will likely create a strong sense of pride among its owners.)

An **innovation** is successful implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. Innovation is the practical application of new inventions into marketable products and services

#### **Service**

Intangible: Associate service with something tangible

Perishable: Manage demand to utilize supply

Inseparable: Capitalize advantages of person providing service

Variable: Standardize service delivery as much as possible

b) Discuss any five kinds of new products identified by Booz Allen and Hamilton.

#### **Sample Answer**

##### **New To The World**

These new products create entirely new markets. Examples: WiFi, Internet, Digital Camera, etc.

##### **New Product Lines**

To enter an established market for the first time. Example: Philips in flat TV (after existing CTV market)

##### **Additions to the Existing Product Lines**

Additions or supplements to established product lines. Example: McDonalds Pudina flavour burger for Indian consumers.

##### **Improvements To Existing Products**

Improved performance or greater value to replace existing products. Examples: Windows XP, 8, 10

### **Repositioning**

Existing products targeted to new markets or market segments.

It is the task of implementing a major change in the target market's perception of the product's key benefits and features, relative to the offerings of competitive products.

To successfully reposition a product, the firm has to change the target market's understanding of the product. This can be challenging, particularly for well-established or strongly branded products.

Example: Airline Economy Class with some airlines is now advertised as Premium Economy Class with small additional benefits

### **Cost Reductions**

Similar performance at lower cost.

Example: Newer versions of existing mobile phones

c) Explain in detail the four elements where values can be added to the basic or 'core' product to augment its appeal.

### **Sample Answer**

#### **Core product**

"the problem-solving services or core benefits that consumers are really buying when they obtain a product"

Core benefit: the fundamental service or benefit being purchased.

the essential basics needed to compete in a product market

e.g. a smart device needs to be able to connect to the Internet

#### **Actual or generic product**

"a product's parts, quality level, features, design, brand name, packaging and other attributes that combine to deliver core product benefits"

the product needs to function seamlessly with all of its features to deliver the core product and create customer value.

e.g. a fully integrated in-vehicle infotainment as part of an automobile

Generic product: the material properties that deliver the core benefits.

#### **Augmented product**

"additional consumer services and benefits built around the core and actual products" offers features, services or benefits that go beyond normal expectations

e.g. free installation, free broadband connection for a year etc

**Potential product**, an additional category highlighted by Levitt (1986)– definition:

- includes all of the features and services that could be envisaged as beneficial to customers
- Potential product: additional augmentation and transformations that may be added in future  
E.g. installing wheels on luggage after the technology used for scooter and skateboard wheels improved