

## Chapter 22: (2011 Assignments) – Answer

1. When material selection process becomes necessary?

*Answer:*

Situations when material selection process becomes necessary:

- Selection of materials for a new product or design
- Re-evaluation of an existing product or design to: reduce cost, increase reliability, improve performance, etc.

2. Give the four essential steps to be followed during material selection process

*Answer:*

- Analysis of the material requirements
- Screening of potential materials
- Narrow pool of potential materials
- Design calculations

3. Give the expression for performance index

*Answer:*

$$P = \sigma^{1/2}/\rho$$

Where,  $\sigma$  = strength and  $\rho$  = density

4. List two important criteria that decides the cost of a product

*Answer:*

- Scarcity (related to supply and demand)
- The cost and amount of energy required to process the material

5. What is the next step after material selection?

*Answer:*

Once an appropriate material has been chosen, a working concept is developed and additional material property testing is conducted to determine the influence of the manufacturing process on critical design properties.

6. How computerized database helps in material selection and design process?

**Answer:**

Computerized database has large amount of information about 100,000 commercially available metal, ceramics, polymers, and composites with a range of properties and costs that can be stored and retrieved. This availability of material property information helps us in the process of selecting a suitable material. It also facilitates in transferring data over networks for further CAD or CAM analysis.

7. What are the drawbacks of having computerized database?

**Answer:**

- Very costly to build and maintain a large database
- Access and sharing issues
- Maintenance of quality control of data

8. What are the factors that will have an effect over the decision of particular material?

**Answer:**

- Performance – extent to which the performance criteria appropriate to the application are satisfied
- Cost – what price must be paid to achieve a given level of value (performance)

9. State true or false

‘Cost benefit analysis is one of the approaches for material selection’

**Answer:**

True

10. During material selection one must consider \_\_\_\_\_ & \_\_\_\_\_

**Answer:**

- Necessary service performance
- Process ability of the material into finished part