GUJARAT TECHNOLOGICAL UNIVERSITY

DI – 5 SEMESTER – OLD PAPER – W23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Manufacturing Engineering -III- 4351902

Unit 1: Introduction to Manufacturing Engineering: III

Repeated Questions:

1. **Define/Explain key cutting parameters: Depth of Cut, Cutting Speed, Metal Removal Rate.**
    - Appeared in: WIN 24 (Q1a, 03 marks), SUM 24 (Q1b, 03 marks)
2. **Explain with a neat sketch: Thread Rolling.**
    - Appeared in: WIN 23 (Q1c, 07 marks), SUM 24 (Q3c, 07 marks)
3. **List and explain different types of threads with their applications.**
    - Appeared in: SUM 24 (Q3a, 03 marks), SUM 25 (Q3a, 03 marks)

Other Important Questions:

- What is the basic definition of a thread in mechanical engineering, and why are threads commonly used? (WIN 23 - Q1a, 03 marks)
- Summarize attitude, knowledge, and skill required for effective shop floor supervision in machine tools-based industries. (WIN 23 - Q1b, 04 marks)
- Classify different types of threads and list major methods of thread manufacturing. (WIN 23 - Q1c (OR), 07 marks)
- Define following terms for thread: (i) Pitch diameter (ii) Minor diameter (iii) Thread angle (SUM 25 - Q3a, 03 marks)
- Define following terms for gear: (i) Module (ii) Circular pitch (iii) Pressure angle (SUM 25 - Q1a, 03 marks)
- Draw a neat sketch of a single point cutting tool showing its geometry. (SUM 25 - Q1b, 04 marks)

Unit 2: Gear manufacturing and finishing processes.

Repeated Questions:

1. **Explain Gear Hobbing process with a neat sketch and list its merits & demerits.**
    - Appeared in: SUM 24 (Q1c, 07 marks), SUM 25 (Q1c (OR), 07 marks), WIN 23 (Q2c (OR), 07 marks)
2. **Explain Gear Milling process with a neat sketch and list its merits & demerits.**
    - Appeared in: SUM 24 (Q1a, 03 marks), WIN 23 (Q2c, 07 marks), SUM 25 (Q1c, 07 marks), WIN 24 (Q2a, 03 marks)
3. **Compare Gear Generating and Gear Forming processes.**
    - Appeared in: SUM 24 (Q2b, 04 marks), WIN 23 (Q2a, 03 marks)

Other Important Questions:

- Classify various types of gears. (WIN 23 - Q2a (OR), 03 marks)
- List the types of gears and explain any three types with a figure. (WIN 24 - Q1c, 07 marks)
- Justify the requirement of gear finishing processes. (WIN 23 - Q2b (OR), 04 marks)
- Identify gear efficiency improvement processes and explain any one. (WIN 23 - Q2b, 04 marks)
- Name at least three types of gear manufacturing processes and explain any one of them with a neat sketch. (SUM 25 - Q2b, 04 marks)
- Compare gear hobbing and gear shaping processes. (SUM 25 - Q2b (OR), 04 marks)
- Explain merits and demerits of Gear Shaping. (WIN 24 - Q2a (OR), 03 marks)
- Write a short note on gear shaving process. (SUM 24 - Q2b, 04 marks)

Unit 3: Rapid Prototyping

Repeated Questions:

1. **Explain Fused Deposition Modeling (FDM) with a diagram and list its advantages and disadvantages.**
    - Appeared in: SUM 25 (Q2c, 07 marks), WIN 23 (Q3c (OR), 07 marks), WIN 24 (Q2c (OR), 07 marks)
2. **Explain the working principle of Rapid Prototyping.**
    - Appeared in: WIN 24 (Q2c, 07 marks), SUM 25 (Q2a, 03 marks)
3. **Explain Stereolithography (SLA) in detail with a diagram/neat sketch.**
    - Appeared in: SUM 24 (Q2c, 07 marks), WIN 23 (Q3c, 07 marks), SUM 25 (Q3b, 04 marks)

Other Important Questions:

- Define Rapid Prototyping. (SUM 24 - Q2a, 03 marks)
- What are the steps involved in Rapid Prototyping? (WIN 23 - Q3a, 03 marks)
- Explain merits and demerits of Rapid Prototyping. (WIN 24 - Q2b, 04 marks)
- Classify Rapid Prototyping Methods and write their uses. (WIN 24 - Q2b (OR), 04 marks)
- Explain how the adoption of rapid prototyping in a manufacturing company can enhance product development speed and quality. (WIN 23 - Q3b, 04 marks)
- Describe the application of rapid prototyping. (WIN 23 - Q3a (OR), 03 marks)
- Explain Selective Laser Sintering (SLS) and justify why support structure is not required in SLS. (SUM 24 - Q2c (OR), 07 marks)
- Explain in brief about Selective Laser Sintering (SLS). (WIN 24 - Q3a, 03 marks)
- Explain Three Dimensional Printing (3DP) with a diagram and list its advantages and disadvantages. (SUM 25 - Q2c (OR), 07 marks)
- Explain Photosolidification rapid prototyping method with a sketch. (SUM 25 - Q3b (OR), 04 marks)
- State various steps to follow to produce a part in rapid prototyping. (SUM 24 - Q2a (OR), 03 marks)

Unit 4: Thread production Methods.

Repeated Questions:

1. **Explain Thread Milling with a neat sketch.**
    - Appeared in: SUM 25 (Q3c, 07 marks), WIN 24 (Q3c (OR), 07 marks), SUM 24 (Q3c (OR), 07 marks)

Other Important Questions:

- Explain thread rolling with a neat sketch and give advantages of thread rolling over thread machining. (SUM 24 - Q3c, 07 marks)
- State the Thread Production Methods and explain “Thread Chasing”. (WIN 24 - Q3c, 07 marks)
- Explain tool mounting method on thread production machine. (SUM 25 - Q3c (OR), 07 marks)
- Classify the major types of thread. (WIN 24 - Q3a (OR), 03 marks)
- Define Left hand side thread and Right-hand side thread with a figure. (WIN 24 - Q3b, 04 marks)
- Draw “V” thread and explain various components. (WIN 24 - Q3b (OR), 04 marks)
- Draw the neat sketch of element of thread and define any three of them. (SUM 24 - Q3a (OR), 03 marks)
- Write a short note on Laminated Object Manufacturing (LOM). (SUM 24 - Q3b (OR), 04 marks)

Unit 5: Computer integrated Manufacturing (CIM)

Repeated Questions:

1. **Explain the scope of Computer Integrated Manufacturing (CIM) and list its benefits.**
   - Appeared in: WIN 23 (Q4c, 07 marks), WIN 24 (Q5c, 07 marks)
2. **Draw and explain the CIM wheel.**
   - Appeared in: SUM 25 (Q4c, 07 marks), SUM 24 (Q4c (OR), 07 marks), WIN 23 (Q4c (OR), 07 marks)
3. **What is the Role of management in Computer Integrated Manufacturing (CIM)?**
   - Appeared in: WIN 23 (Q4b, 04 marks), SUM 25 (Q4b (OR), 04 marks)

Other Important Questions:

- Explain the role of a manufacturing engineer in CIM. (SUM 25 - Q4a, 03 marks)
- What is the Role of manufacturing engineering in computer integrated manufacturing (CIM)? (WIN 24 - Q5b, 04 marks)
- Enlist the scope of CIM and explain any two in detail. (SUM 25 - Q4b, 04 marks)
- Explain the benefits of CIM. (SUM 25 - Q4a (OR), 03 marks)
- List various benefits of CIM. (SUM 24 - Q4b (OR), 04 marks)
- What is the role of CIM in manufacturing? (SUM 24 - Q4b, 04 marks)
- Explain the relationship between CAD and CAM. (SUM 24 - Q4c, 07 marks)
- Explain the concept of the IOSI Reference Model. (SUM 25 - Q4c (OR), 07 marks)

Unit 6: Non-conventional and advance methods of Machining.

Repeated Questions:

1. **Explain the construction and working of Electrical Discharge Machining (EDM) with a neat sketch.**
    - Appeared in: WIN 23 (Q5c, 07 marks), WIN 24 (Q4c, 07 marks), SUM 25 (Q5c, 07 marks)
2. **Differentiate between Conventional and Non-Conventional Machining.**
    - Appeared in: WIN 24 (Q4a, 03 marks), SUM 25 (Q5a (OR), 03 marks), WIN 23 (Q5a (OR), 03 marks)
3. **Classify Non-Conventional Machining methods.**
    - Appeared in: WIN 23 (Q5a, 03 marks), WIN 24 (Q4a (OR), 03 marks), SUM 25 (Q5a, 03 marks)

Other Important Questions:

- What is Electrochemical Machining (ECM)? and how does it work in the manufacturing process? (WIN 24 - Q4c (OR), 07 marks)
- With the help of a neat sketch, explain the working principle of electrochemical machining. (SUM 25 - Q5c (OR), 07 marks)
- How Ultrasonic Machining (USM) can be applied to produce precision holes in hard materials for aerospace engine components? (WIN 24 - Q4b, 04 marks)
- How Laser Beam Machining (LBM) process can be employed to create intricate patterns in manufacturing? (WIN 24 - Q4b (OR), 04 marks)
- Draw a line diagram of Ultrasonic Machining (USM) and label various parts. (WIN 23 - Q4a (OR), 03 marks), (WIN 24 - Q5a, 03 marks)
- Give six reasons for the development of non-conventional manufacturing (NCM). (WIN 23 - Q4a, 03 marks), (WIN 24 - Q5a (OR), 03 marks)
- Explain Abrasive Jet Machining with a neat sketch. (SUM 25 - Q5b, 04 marks)
- State the working principle of Abrasive Jet Machining. (SUM 24 - Q5b (OR), 04 marks)
- Explain Laser Beam Machining. (SUM 24 - Q5a, 03 marks)
- Explain Electron Beam Machining. (SUM 24 - Q5a (OR), 03 marks)
- Explain the need for Micro Electro Mechanical System (MEMS). (SUM 24 - Q5c (OR), 07 marks)
- Explain Chemical Vapour Deposition (CVD) technique. (SUM 25 - Q5b (OR), 04 marks)
- Write a short note on Chemical Vapour Deposition (CVD). (SUM 24 - Q4a (OR), 03 marks)
- Write a short note on PAM (Plasma Arc Machining). (SUM 24 - Q4a, 03 marks)
- Explain working principle of EDM, Identify the mechanism of material removal, transfer media and energy source for EDM. (SUM 24 - Q5c, 07 marks)

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