

**MODERN MANUFACTURING TECHNOLOGY  
(MECH 4222)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Cope and drag refers to which of the following process  
(a) Casting (b) Welding  
(c) Forging (d) Rolling.
  - (ii) In materials science, the measure of the resistance to localized plastic deformation induced by either mechanical indentation or abrasion is termed as  
(a) Elasticity (b) Hardness  
(c) Toughness (d) Ductility.
  - (iii) Which of the following method is not related to forming process  
(a) Rolling (b) Forging  
(c) Selective laser sintering (d) Extrusion.
  - (iv) The ability of a material to be plastically deformed without fracturing is termed as  
(a) Elasticity (b) Hardness  
(c) Toughness (d) Ductility.
  - (v) Cellular manufacturing is mostly used in  
(a) Mass production (b) Batch production  
(c) Job shop production (d) All of (a), (b) & (c).
  - (vi) Process of converting STL file model in to layers is called \_\_\_\_\_ in rapid prototyping.  
(a) chopping (b) slicing  
(c) cutting (d) trimming
  - (vii) The laser beam machining can be carried out, when the media for energy transfer between the tool and work piece is  
(a) air (b) liquid  
(c) vacuum (d) any one of the above medium.

- (viii) Which of the following material is not generally machined by Ultrasonic Machining (USM)?  
(a) Copper (b) Glass  
(c) Silicon (d) Germanium.
- (ix) Choose the odd one out.  
(a) PAM (b) USM  
(c) LBM (d) EDM.
- (x) In which of the following processes, the shape of the tool is same as that of the cavity produced?  
(a) Plasma Arc Machining (b) Ultrasonic machining  
(c) Electro Discharge Machining (d) Both (b) & (c).

**Group - B**

2. (a) Explain the use of a closed mould in casting with proper figure. *[(CO1)(Apply/IOCQ)]*  
(b) Explain the set-up required for extrusion process with neat sketch. *[(CO1)(Create/HOCQ)]*  
**6 + 6 = 12**
3. (a) Explain oxy- acetylene gas welding process with neat sketch. *[(CO1)(Remember/LOCQ)]*  
(b) Differentiate between hardness and toughness. *[(CO2)(Analyze/IOCQ)]*  
**6 + 6 = 12**

**Group - C**

4. (a) Distinguish between open and closed loop numerical control with diagram. *[(CO3)(Analyze/IOCQ)]*  
(b) Explain the process of stereo-lithography with figure. *[(CO3)(Apply/IOCQ)]*  
**6 + 6 = 12**
5. (a) Justify the advantages of cellular manufacturing with proper example. *[(CO4)(Evaluate/HOCQ)]*  
(b) Describe the method and importance to classify part families with the principle of group technology. *[(CO4)(Evaluate/HOCQ)]*  
**6 + 6 = 12**

**Group - D**

6. (a) Why are non-traditional processes important? Differentiate the traditional and non-traditional machining processes. *[(CO5)(Analyze/IOCQ)]*  
(b) Explain in short the various components used in USM machining unit with suitable diagram. *[(CO5)(Understand/LOCQ)]*  
**(2 + 4) + 6 = 12**

7. (a) Show chemical reactions that take place in electrolyte, anode and cathode during Electro-chemical Machining (ECM) process and also mention the process parameters of ECM. [[CO5](Analyze/IOCQ)]  
(b) Briefly describe spark initiation and material removal mechanism in Electric-discharge Machining (EDM) process. [[CO5](Understand/LOCQ)]  
**(4 + 2) + 6 = 12**

**Group - E**

8. (a) Write the advantages, limitations and applications of LBM. [[CO5](Analyze/IOCQ)]  
(b) With a suitable diagram, explain the working principle of Electron Beam Machining (EBM) process. [[CO5](Understand/LOCQ)]  
**6 + 6 = 12**
9. (a) Explain the process of PAM with a neat sketch. [[CO5](Remember/LOCQ)]  
(b) Differentiate between high velocity explosive forming process with conventional forming process. [[CO6](Analyze/IOCQ)]  
**6 + 6 = 12**
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<i>Cognition Level</i>	<i>LOCQ</i>	<i>IOCQ</i>	<i>HOCQ</i>
<i>Percentage distribution</i>	25	56	19

**Course Outcome (CO):**

At the end of the course, a student will be able to:

1. Explain basic idea about conventional manufacturing processes.
2. Describe different mechanical properties.
3. Discuss basic ideas of NC and CNC machines and Rapid Prototyping.
4. Explain working knowledge on Computer Integration in manufacturing.
5. Discuss various Non-traditional Machining processes and their application.
6. Explain the basic idea of high energy rate forming processes.

*\*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*

