

Group – E

8. (a) What are the important process parameters of Electron Beam Machining (EBM) process?
 (b) Explain why flash tube and focussing tube are needed in Laser Beam Machining (LBM) process.
 (c) With a simple diagram explain the working principle of Plasma Arc Machining (PAM).

4 + 4 + 4 = 12

9. (a) Write down the applications, advantages and limitations of High Energy Rate Forming Processes over Conventional Forming Processes.
 (b) Describe with a neat sketch the working principle of Electro-Magnetic Forming process.

6 + 6 = 12**ADVANCED MANUFACTURING TECHNOLOGY
(MECH 4102)****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) Abrasive Jet Machining (AJM) uses a jet of
 (a) abrasive particles suspended in oil
 (b) abrasive particles mixed with glycerine
 (c) abrasive particles suspended in water
 (d) abrasive particles mixed with air.
- (ii) In Ultrasonic Machining (USM), the material removal rate will be higher for material with
 (a) higher toughness (b) higher ductility
 (c) lower toughness (d) higher fracture strain.
- (iii) Commercial Electrochemical Machining (ECM) is carried out at a combination of
 (a) low current low voltage (b) low current high voltage
 (c) high current low voltage (d) high current high voltage.
- (iv) Laser Beam is produced due to
 (a) spontaneous emission
 (b) stimulated emission followed by spontaneous emission
 (c) spontaneous emission followed by spontaneous absorption
 (d) spontaneous absorption followed by stimulated emission.
- (v) Material Removal Rate in Electrochemical Machining (ECM) depends on
 (a) hardness of work material
 (b) atomic weight of work material
 (c) thermal conductivity of work material
 (d) ductility of work material.

- (vi) Circular Interpolation (clockwise) in CNC is implemented by the G-code
 (a) G00 (b) G01 (c) G02 (d) G03.
- (vii) Automated Guided Vehicle (AGV) is used for material transfer between
 (a) two fixed location in single direction
 (b) two fixed location in bi-direction
 (c) any location to any location single direction
 (d) any location to any location bi-direction.
- (viii) CAPP is the short form for
 (a) Computer Aided Part Programming
 (b) Centralised Automated Program Platform
 (c) Computer Aided Process Planning
 (d) Centralised Aided Program Platform.
- (ix) The hardest cutting tool material is
 (a) Zirconia toughened alumina (b) SIALON
 (c) Diamond (d) CBN.
- (x) In CNC programming M05 is use for
 (a) spindle start (b) spindle stop
 (c) tool change (d) program end.

Group – B

- 2. (a) What is Numerical Control (NC)? How Computer Numerical Control (CNC) differs from NC? Write down the advantages of CNC Machines over NC Machines.
- (b) Write a manual part program for machining a component as shown in Fig.1 in a CNC Turning Centre. Raw material is Mild Steel cylindrical bar of 125 mm diameter.

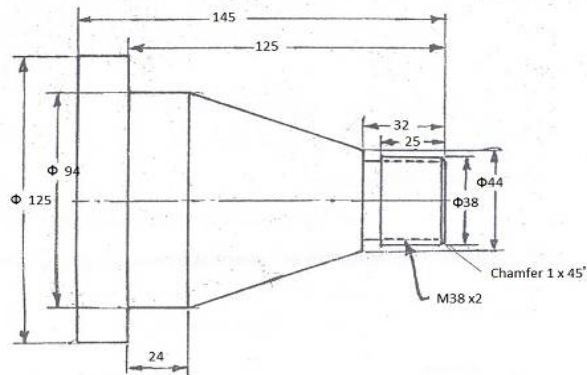


Fig.1

$(1 + 1 + 2) + 8 = 12$

- 3. (a) Explain how CAD-CAM improves productivity of a manufacturing system.
 - (b) Discuss with suitable sketches the two solid modelling techniques used in CAD.
 - (c) Explain wire guidance system used in AGV with neat sketch.
- 3 + 5 + 4 = 12**

Group – C

- 4. (a) Discuss the advantage of group technology over traditional design and manufacturing process.
 - (b) Explain with suitable example how do you code a product with OPITZ classification system?
 - (c) Describe working principle and importance of any one non contact CAQC method.
- 3 + 6 + 3 = 12**
- 5. (a) Discuss any two modern cutting tools with reference to materials used and improved geometry.
 - (b) Describe the Creep grinding process mentioning the level of important machining parameters of the process. Which type of grinding wheel is suitable for such a process?
 - (c) Explain the reverse engineering process with a suitable example.
- 4 + (3 + 1) + 4 = 12**

Group – D

- 6. (a) Briefly explain the factors, which influence the material removal rate in Ultrasonic Machining (USM).
 - (b) Explain the function of intensifier and accumulator used in Water Jet Machining (WJM) process?
 - (c) Draw the schematic layout of Abrasive Jet Machining (AJM) and explain its operating characteristics.
- 4 + 4 + 4 = 12**
- 7. (a) Prove that in a steady state with constant feed, the gap between the tool and workpiece in Electro-chemical Machining (ECM) process remains constant.
 - (b) What are the different types of pulse generators used in Electric Discharge Machining (EDM) process? Explain any one of them with proper sketch of the circuit.

6 + (2 + 4) = 12