

**MODERN MANUFACTURING TECHNOLOGY
(MECH 4222)**

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

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

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) The ability of a material to be plastically deformed without fracturing is termed as
 - (a) Elasticity
 - (b) Hardness
 - (c) Toughness
 - (d) Ductility
- (ii) Multi point cutting tool used in
 - (a) Lathe
 - (b) Shaping
 - (c) Milling
 - (d) None of the above
- (iii) The following gas used in gas welding
 - (a) Oxygen
 - (b) Acetylene
 - (c) Carbon dioxide
 - (d) Both (a) and (b)
- (iv) Choose the correct sequence to generate prototype.
 - (a) 3D CAD data - CAD solid model - STL file - RP prototype
 - (b) CAD solid model - 3D CAD data - RP prototype - STL file
 - (c) STL file - 3D CAD data - CAD solid model - RP prototype
 - (d) 3D CAD data - STL file - CAD solid model - RP prototype
- (v) OPITZ classification and coding system uses a
 - (a) 5-digit code
 - (b) 6-digit code
 - (c) 8-digit code
 - (d) 9-digit code.
- (vi) Process of converting STL file model in to layers is called_____in rapid prototyping.
 - (a) Chopping
 - (b) Slicing
 - (c) Cutting
 - (d) Trimming
- (vii) Material removal rate in electro-chemical 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

- (viii) Dielectric medium in electric discharge machining (EDM) is used to
 - (a) Make the medium conducting
 - (b) Flush away the debris
 - (c) Decrease the material removal rate
 - (d) Resist tool wear
- (ix) Which of the following is a high energy rate forming process?
 - (a) Extrusion method
 - (b) Deep drawing method
 - (c) Coining method
 - (d) Explosive method
- (x) 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

Fill in the blanks with the correct word

- (xi) Oxidizing flame in gas welding is created when _____.
- (xii) The acoustic head is associated with _____.
- (xiii) Selective laser sintering is a process of _____.
- (xiv) Abrasive jet machining (AJM) uses a jet of _____.
- (xv) The process of material removal in electro discharge machining (EDM) occurs through a series of _____ between the tool and the work-piece.

Group - B

- 2. (a) Explain the application of any three lathe operations with suitable sketch. [[CO1] (Apply/IOCQ)]
 - (b) Describe the following items of mold with suitable sketch.
 - (i) Cope box
 - (ii) Runner
 - (iii) Riser.[[CO1] (Understand/LOCQ)]
- 6 + 6 = 12**
- 3. (a) Differentiate between up milling and down milling operation with figure. [[CO1] (Analyze/IOCQ)]
 - (b) Differentiate between ductility and brittleness. [[CO2] (Analyze/IOCQ)]
- 6 + 6 = 12**

Group - C

- 4. (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**

5. (a) State the working principle and application of “3D printing” with figure. *[[CO3) (Apply/IOCQ)]*
 (b) What is flexible manufacturing system? Justify the importance of it. *[[CO4) (Evaluate/HOCQ)]*
6 + (4 + 2) = 12

Group - D

6. (a) State the working principle and the factors that affect the material removal rate in the abrasive jet machining (AJM) process. *[[CO5) (Apply/IOCQ)]*
 (b) Briefly explain the significance of ‘intensifier’ and ‘accumulator’ used in water jet machining (WJM) process. Identify the application areas of the WJM process. *[[CO5) (Remember/LOCQ)]*
6 + (4 + 2) = 12
7. (a) State the working principle and the factors that affect the material removal rate in the electro chemical machining (ECM) process. *[[CO5) (Evaluate /HOCQ)]*
 (b) State the application areas and limitations of electric discharge machining (EDM) process. *[[CO5) (Understand/LOCQ)]*
6 + 6 = 12

Group - E

8. (a) Explain Electro-Hydraulic forming process. *[[CO6) (Understand/LOCQ)]*
 (b) With a simple diagram explain the working principle of plasma arc machining (PAM) process. *[[CO5) (Analyse/IOCQ)]*
6 + 6 = 12
9. (a) State the working principle of laser beam machining (LBM) Process with suitable diagram. *[[CO5) (Analyse/IOCQ)]*
 (b) Explain the explosive forming process. *[[CO6) (Understand/LOCQ)]*
6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	31.25	43.75	21.00

