MODERN MANUFACTURING TECHNOLOGY
(MEC3222)

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) Rolling is a
(a) Casting process (b) Forming process
(c) Machining process (d) Joining process

(ii) In sand casting, the pattern is used to
(a) Melt the metal (b) Form the cavity
(c) Cool the casting (d) Remove defects

(iii) Hot working is carried out
(a) Below the recrystallization temperature
(b) At room temperature
(c) Above the recrystallization temperature
(d) Below the melting point only

(iv) OPITZ classification and coding system uses a
(a) 5-digit code (b) 6-digit code
(c) 8-digit code (d) 9-digit code.

(v) Cellular manufacturing is mostly used in
(a) Mass production (b) Batch production
(c) Job shop production (d) All of the above

(vi) Which of the following methods is not related to Rapid prototyping
(a) Stereo-lithography (b) Fused deposition
(c) Selective laser sintering (d) Reverse sintering

(vii) Which of the following is NOT a non-traditional machining process?
(a) EDM (b) ECM (c) Milling (d) USM

(viii) The frequency range used in USM is
(a) 50–100 Hz (b) 500–1000 Hz
(c) 20–40 kHz (d) Above 1 MHz

(ix) Laser Beam Machining removes material by
(a) Abrasive erosion (b) Chemical dissolution
(c) Thermal melting and vaporisation (d) Electrolysis

(x) LASER stands for
(a) Light amplification by stimulated emission of radiation
(b) Light amplification by stimulated erosion of reaction
(c) Light amplification by stimulated erosion of radiation
(d) Light amplification by stimulated emission of reaction

Fill in the blanks with the correct word

(xi) Materials that fracture without significant plastic deformation are called _____ materials.

(xii) CNC means computer _____ control.

(xiii) Abrasive jet machining (AJM) uses a jet of _____.

(xiv) The dielectric fluid commonly used in EDM is _____.

(xv) The velocity of electrons in EBM is close to the speed of _____.

Group - B

2. (a) Explain the concept of heat treatment and its objectives in manufacturing. *[(CO1) (Understand/LOCQ)]*

(b) Explain the quick return mechanism of a shaping machine with a suitable diagram. *[(CO1) (Understand/LOCQ)]*

6 + 6 = 12

3. (a) Differentiate between ductility and brittleness with suitable examples. *[(CO1) (Analyse/IOCQ)]*

(b) Explain the set-up required for extrusion process with a neat sketch *[(CO1) (Understand/LOCQ)]*

6 + 6 = 12

Group - C

4. (a) Distinguish between open and closed loop numerical control with diagram. *[(CO2) (Analyse/IOCQ)]*

(b) Explain the steps of "stereo-lithography" with figure. *[(CO2) (Apply/IOCQ)]*

6 + 6 = 12

5. (a) Define Flexible Manufacturing System (FMS). Justify the benefits of Flexible Manufacturing System. *[(CO2) (Evaluate/HOCQ)]*

(b) Explain the procedure to code a product and identify its part family applying the principle of group technology. *[(CO2) (Apply/IOCQ)]*

6 + 6 = 12

Group - D

6. (a) Analyse the differences between ECM and EDM processes. *[(CO3) (Analyse/HOCQ)]*
   (b) Explain the applications, advantages and limitations of Water Jet Machining. *[(CO3) (Understand/LOCQ)]*

6 + 6 = 12

7. (a) Explain how the material removal process occurs in ultrasonic machining (USM) process. *[(CO3) (Evaluate /HOCQ)]*
   (b) Explain the working principle of abrasive jet machining (AJM) with a neat labelled diagram. *[(CO3) (Understand/LOCQ)]*

6 + 6 = 12

Group - E

8. (a) Explain Electro-Hydraulic forming process. *[(CO5) (Understand/LOCQ)]*
   (b) Explain the working principle of Plasma Arc Machining (PAM) with a neat diagram. *[(CO4) (Analyse/IOCQ)]*

6 + 6 = 12

9. (a) Differentiate between high velocity explosive forming with conventional forming process. *[(CO5) (Analyse/IOCQ)]*
   (b) Explain the principle of laser generation and amplification used in Laser Beam Machining. *[(CO4) (Understand/LOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75	37.50	18.75