8. (a) How a complex shape can be cut using EBM process ? Explain. **7½**

   (b) Discuss, how the process variables influence MRR, HAZ and pattern generation in electron beam machining. **7½**

(Compulsory Question)

9. (a) How will you decide to recommend specific advanced machining processes for cutting a glass plate into two pieces ?

   (b) Diameter of the nozzle is 1.0 mm and jet velocity is 200 m/s. Find the volumetric flow rate (cm^3/s) of the carrier gas and abrasive mixture (V_{a+g}).

   (c) The average frequency of sparks in EDM is.................

   (d) At what rate slurry is pumped through nozzle is USM ?

   (e) What is the use of transducer used in USM machine ?

   (f) Write independent and dependent variables of AJM process.

J-21-0067

B. Tech. EXAMINATION, 2021

Semester VI (CBCS)

MODERN MANUFACTURING PROCESSES

ME-608

Time : 2 Hours   *Maximum Marks : 60*

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. (a) What is the need for using non-traditional machining ? Differentiate between traditional and non-traditional machining. **7½**

   (b) What are the limitations of conventional machining process ? **7½**

2. (a) If suppose USM is used for drilling a hole (under the same machining conditions) in Aluminium and Cast Iron. Which one will have higher depth of the drilled hole and why ? **7½**

(b) What do you understand by 'transducer' and 'magnetostriction effects' in Ultrasonic machining ? **7½**

Section B

3. Explain the working principle, equipments, mechanics of metal removal, MRR, applications, advantages and limitations of Abrasive Jet Machining. **15**

4. During an ECM operation on an iron workpiece with a square-face copper tool (using brine as the electrolyte), both having a flat surface, a feed rate of 2 mm/min is used. The dc voltage used is 10 V and the total overvoltage is 1.5 V. The dimension of the tool face is 25.4 mm × 25.4 mm. The boiling temperature of the electrolyte is 95°C. Find out the total force acting on the tool. Use the data :

Viscosity of electrolyte $= 0.876 \times 10^{-3}$ kg/m-sec,
Density of electrolyte $= 1.088$ g/cm^3,
Specific heat of electrolyte $= 0.997$,

Conductivity of electrolyte $= 0.2$ ohm^{-1} cm^{-1},
Ambient temperature $= 35°C$.
Neglect the variation in electrolyte conductivity due to the temperature change. The electrolyte is fed from one side of the square-shaped tool. **15**

Section C

5. Find the condition for maximum power delivery to the discharging circuit in Electro Discharge Machining. **15**

6. (a) LBM and EDM both are thermal processes. However, it is found that the first one result in more thermal damage to the machines component than the second one. Is it true ? Justify your answer. **8**

(b) Explain terms 'Duty factor' and 'Ignition delay' used in EDM. **7**

Section D

7. (a) Discuss the process parameters of EBM and their influence on machining quality. **8**

(b) List out the advantages and limitationas of PAM process. **7**

(g) What are the functions of a catcher used in WJM system ?

(h) Why tungsten is not used as electrode material in PAM ?

(i) Write four specific applications where you feel that EBM should be the preferable choice.

(j) Can contoured cavities be machined chemically ?

1½×10=15