Code: 9A03708 **R09**

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2014

MODERN MANUFACTURING METHODS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Explain the need and characteristic features of non-traditional machining.
b) (What are the advantages of non-traditional machining process?

2 (a) With a neat sketch, explain the working principle of ultrasonic machining process (USM).
(b) Mention the advantages, disadvantages and applications of ultrasonic machining.

3 (a) Explain the following variables that influence the metal removal and accuracy of machining in abrasive jet machining (AJM)
(i) Carrier gas.
(ii) Types of abrasives.
(iii) Standoff distance.
(iv) Mean number of abrasive grains per unit volume of the carrier gas.
(b) What are the process variables that affect the performance of water jet machining process?

4 (a) Explain with schematic diagram the electro chemical grinding process.
(b) Calculate the metal removal state and electrode feed rate when Icon is electro chemically machined using copper electrode and sodium chloride solution (specific resistance = 5.0 ohm.cm). The power supply data of the ECM used are: Supply voltage -18 VDC, current – 5000 A, atomic weight if Iron = 56; Valency = 2; Density = $7.87 \times 10^6 g/m^3$. Assume a tool gap of 0.5 mm (constant).

5 (a) Explain flushing and explain any two methods of flushing in EDM process.
b) (What are the functions of dielectric fluid?
(c) Explain the following process characteristics with reference to EDM:
(i) Heat affected zone.
(ii) Metal removal rate.

6 (a) With a neat sketch, explain the mechanism of metal removal in laser beam machining.
(b) Mention the advantages and limitations of electron beam machining.

7 (a) Explain the principle of plasma generation and mechanism of metal removal in plasma arc machining.
(b) List the factors to be considered in the selection of etchants in chemical machining.

8 (a) Give a brief note on:
(i) Abrasive flow machining.
(ii) Electro stream drilling.
(b) Describe in detail the process of selective laser sintering.

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