2053
B.E. (Mechanical Engineering)
Sixth Semester
MEC-606: Advanced Manufacturing Techniques

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt _five_ questions in all, including Question No. I which is compulsory and selecting two questions _from_ each Unit. Use of calculator is allowed. Assume missing data if necessary.

x-x-x

I.   Attempt the following:-

   a) What is hybrid machining process?

   b) Suggest advanced machining and also write parameters to drill in MS plate.

   c) What do you mean by Magnetostriction effect?

   d) Why ultrasonic assisted EDM is preferred?

   e) How ECG is different from ECM?   (5x2)

UNIT - I

II.   a) Diameter of AJM 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.

   b) What are process parameters of USM? Explain effect of amplitude on MRR and surface finish.   (2x5)

III.   a) Explain working principle of chemical blanking process with neat sketch. Write process parameters of chemical blanking.

   b) Define EDM process parameters.   (2x5)

IV.   a) What is ECHM? Write its process parameters.

   b) Electrochemical machining of iron with a copper electrode working in NaCl solution in water, calculate the maximum removal rate if current density is allowed 150 amp/cm^2, density of iron 7.86 gm/cm^3.   (2x5)

P.T.O.

UNIT - II

V.

Find out the approximate time required to machine a hole of diameter equal to 6.0 mm in a tungsten carbide plate (Flow strength of work material = 6.9×10^9 N/m²) of thickness equal to one and half times of hole diameter. The mean abrasive grain size is 0.015 mm diameter. The feed force is equal to 3.5 N. The amplitude of tool oscillations is 25 microns and the frequency is equal to 25 kHz. The tool material is copper having flow strength= 1.5×10^9 N/m². The slurry contains one part of abrasives to one part of water. Take the values of different constant as K1 = 0.3, K2 = 1.8x 10^{-6} (In SI units) and K3= 0.6 and abrasive slurry density = 3.8 g/cm³. Also calculate the ratio of the volume removed by throwing mechanism to the volume removed by hammering mechanism.

(10)

VI.   a) Explain material removal mechanism in plasma arc machining and write its temperature range. How temperature is affecting HAZ?

b) How temperature can vary with electron beam intensity in EBM? Write its limitation.   (2x5)

VII.   What is RC pulse generator? Explain its working with neat sketch.   (10)

x-x-x