Birla Institute of Technology & Science, Pilani
First Semester 2023-2024
Computer Integrated Manufacturing (ME G539)
Mid Semester Test (Open Book)

Date:12/10/2023   **Max Marks:30**   **Max Time:90 min.**

Note: Be succinct, no credit will be given for ambiguous answers. All parts of a question must be answered together and in sequence. Answer of a question must be started from a fresh page.

Q1: Write down your answer **briefly.**   [10]
   i)   What are the various advantages of LM devices used in CNC system?
   ii) Why is bifurcated structure used generally in HMC??
   iii) Why is 3-axis CNC machine is better than $2\frac{1}{2}$ axis during machining of 3D freeform surface?
   iv) Write down drawbacks of nonparametric curves.
   v)   Write down various advantages of incremental encoder over rotary encoder.

Q2:
a) Write down a parametric equation of Bezier curve for the following control points: $B_0(1,3)$, $B_1(4,5)$, $B_2(5,7)$, and $B_3(8,4)$. Calculate the coordinates of the points on the curve at $t = \frac{1}{4}, \frac{2}{4}, \frac{3}{4}$ [10]

b) Generate pulses for execution of the exponential function $p(t) = 7e^{-t}$ with a DDA that has 3 bit register. Calculate the values of p, q, Δz and $\sum \Delta z$ for the DDA integrator at each step and arrange the results in a tabular form. In addition, calculate the clock frequency (f) and plot the output pulse (f_o) for the integrator. Also, plot the contents of p register and integration results w.r.t number of iterations.   [10]

*************************$\mathcal{GOOD\ LUCK}$*************************