National Institute of Technology Hamirpur
Department of Mechanical Engineering
End-Semester Examination (May 2023)
Additive Manufacturing Technology (ME-445)
B.Tech. VIII Semester

Instruction: *All questions are compulsory, weightages of marks are mentioned against the questions*

Time: 3:00 Hrs   Max. Marks: 50

Q.1 What are the advantages and limitations of additive manufacturing over other manufacturing processes? **[10]**

Q.2 (a) Define an STL file format and its types along with associated advantages and disadvantages. **[5]**

(b) What are the different topology rules for valid tessellation in an STL file format? **[5]**

Q.3 (a) What is deviation tolerance? How many triangles will be required for deviation tolerance to be 0.05 mm to represent a circle of 100 mm radius by STL format? **[5]**

(b) Explain the concept of Stereolithography (SLA). How does the DLP device works in a Perfactory system? **[5]**

Q.4 (a) If in a Perfectory system the projector resolution is 1280 × 1024 and the scanned work area selected is 190 mm × 152 mm, calculate the resolution of the machine and the volume of a voxel for 30 μm layer thickness. **[5]**

(b) In binder jetting, explain the continuous and drop on demand system of jetting along with various methods of droplet production? **[5]**

Q.5 (a) Explain the selective laser sintering (SLS) in terms of joining mechanism and powder recoating system. **[5]**

(b) In fused deposition modeling (FDM) what is the die swelling? Derive the relationship for determining the critical pressure applied on wire by the pinch roller mechanism. **[5]**

********BEST OF LUCK***********