Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

## V SEMESTER B.TECH. (MECHATRONICS ENGINEERING) END SEMESTER EXAMINATIONS, DEC.16/JAN.17

SUBJECT: ADDITIVE MANUFACTURING TECHNOLOGY [MTE 4009]

## **REVISED CREDIT SYSTEM**

## Time: 3 Hours MAX. MARKS: 50 Instructions to Candidates: Answer ALL the questions. Missing data may be suitable assumed. Draw neat labelled diagram wherever necessary. 14. Explain the fundamental fabrication processes in manufacturing. (06) 1B. Describe the following: (04)

- i. Valid and Invalid Tessellated Model
- ii. Overlapping Facets
- 2A. With the help of a diagram, explain 3D System's Stereolithography (SLA) process. (05)
- **2B.** Define rapid tooling and classify them.
- **2C.** Explain Optomec's Laser Engineered Net Shaping (LENS) process. (03)
- **3A.** Interpret the STL file shown in figure 3A and apply the right-hand rule adopted by **(06)** STL format to solve the gap encountered.



Figure 3A

(02)

- **3B.** In context of application of additive manufacturing in engineering analysis and (04) planning, define:
  - i. Scaling
  - ii. Form and Fit
  - iii. Mock Up Parts
  - iv. Pre Production Parts
- **4A.** List and explain the steps involved in additive process chain. (06)
- **4B.** Outline the advantages and disadvantages of STL file format. (04)
- 5A. Explain the working process of Stratasys's Fused Deposited Modelling (FDM) (04) process.
- **5B.** Describe the process where an injection mold is prepared by using metal spray (03) technique on a rapid prototype (or additive) model.
- **5C.** With respect to the application of additive manufacturing in design, describe: (03)
  - i. CAD Model Verification
  - ii. Visualizing Objects
  - iii. Proof of Concept