

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: M.TECH  
BRANCH: AMS

SEMESTER : I  
SESSION : MO/18

SUBJECT: PE507 ADDITIVE MANUFACTURING

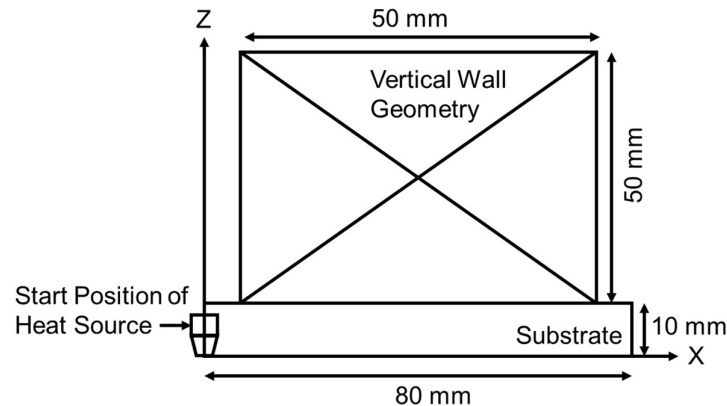
TIME: 3 HOURS

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Classify various Additive Manufacturing Processes and form of deposition material used for deposition. [5]
- Q.1(b) Explain the procedure of product development in Additive Manufacturing. [5]
- Q.2(a) Explain working principle of Selective laser sintering (SLS) and Laser engineered net shaping (LENS) Additive Manufacturing processes with its merits and demerits. [5]
- Q.2(b) You have been assigned a job to manufacture a prototype of a mobile phone cover. List all the processes capable of manufacturing a mobile phone cover and Identify the most suitable additive manufacturing process with justification. [5]
- Q.3(a) Describe the role of Encoders, Process chamber, Safety Interlocks and Sensors in CNC machine systems used for Additive Manufacturing. [5]
- Q.3(b) Explain the recent developments in CNC machines used for Additive Manufacturing. [5]
- Q.4(a) LENS additive manufacturing process with beam diameter as 10 mm is used to build the vertical straight-line geometry of wall as shown in figure. Vertical Geometry of wall is tessellated with triangular mesh as shown in figure. Calculate the number of slices required to build the wall geometry if the height of deposition is 5 mm and write the CNC program for each slice for movement of heat source. [5]



- Q.4(b) Describe concept of part orientation and support generation in additive manufacturing. [5]
- Q.5(a) Describe various methods for support material removal, surface texture and accuracy improvement of Additive Manufactured components. [5]
- Q.5(b) Explain the role of additive manufacturing in rapid prototyping, rapid manufacturing, rapid tooling, repairing and coating. [5]