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[Total No. of Pages : 2]

**8E1923****8E1923****B.Tech. VIII-Sem. (Main/Back) Examination, April/May - 2025****Mechanical Engineering****8ME5-13 Additive Manufacturing****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

*Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205).*

**PART - A****(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. What is the basic principle of the sheet lamination process.
2. Enumerate the significance of bioprinting in biomedical applications.
3. Enumerate the advantages of Electron Beam Melting (EBM) process.
4. What is the need for an additive manufacturing process?
5. Why accuracy is important in SLS?
6. Explain about 3Q Keltool process.
7. Explain the nomenclature of Additive manufacturing machines.
8. What is wire frame modelling?
9. Give the three advantages and applications of Laser Engineering Net Shaping (LENS).
10. Write short note on data processing.

**PART - B****(Analytical / Problem Solving Questions)****Attempt any Five questions.****(5×4=20)**

1. Outline the entire process and materials used in Fused deposition modeling(FDM).
2. Explain the working principle and process of Laminated object manufacturing (LOM).
3. Write short notes on secondary rapid phototyping processes.

4. Outline the various techniques used in tool path generation.
5. Illustrate the principle, and process of Three-Dimensional Printing (3D) with a neat sketch and also list its merits and demerits.
6. How additive manufacturing leads to efficient product development?
7. Summarize the applications, business opportunities, and future directions of additive manufacturing in Food Printing and Printing Electronics.

### **PART - C**

**(Descriptive / Analytical / Problem Solving / Design Questions)**

**Attempt any Three questions.**

**(3×10=30)**

1. Outline the process of part orientation and support structure generation in additive manufacturing.
  2. Define the fundamental principle of stereo lithography process. List and explain the different process parameters of SLA technique with the help of a neat diagram.
  3. What is rapid tooling? Discuss its importance and compare rapid tooling with conventional tooling.
  4. With the help of a neat diagram explain the principle and process involved in Material jetting process.
  5. Develop the process, materials, and applications of the Electron beam melting (EBM) process.
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**8E1823**

Roll No. \_\_\_\_\_

[Total No. of Pages : **2**]**8E1823****B.Tech. VIII-Sem. (Back) Examination, April/May - 2025****Mechanical Engineering****8ME5-13 Additive Manufacturing****Time : 3 Hours****Maximum Marks : 120****Min. Passing Marks : 42****Instructions to Candidates:**

*Attempt All Ten questions from Part A, Five questions out of seven questions from Part B and Four questions out of five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205).*

**PART - A****(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. What category does additive manufacturing (AM) fall under?
2. What do you mean by additive manufacturing?
3. In the context of Stereo Lithography Systems (SLA), 'optical self-focusing' occurs because of ..... (High Temperature of resin/ Low Temperature of resin/ Shrinkage of curved resin).
4. What type of recoating system is used in 'Zypher' by 3D system SLA?
5. What are the main challenges faced in Additive Manufacturing?
6. Name any two commercial products which are made by AM process.
7. How exactly does layer-by-layer adhesion occur in stereo lithography?
8. What are the Errors in STL files?
9. What are the emerging trends in Rapid Tooling?
10. Identify the materials that can be machined by using additive manufacturing.

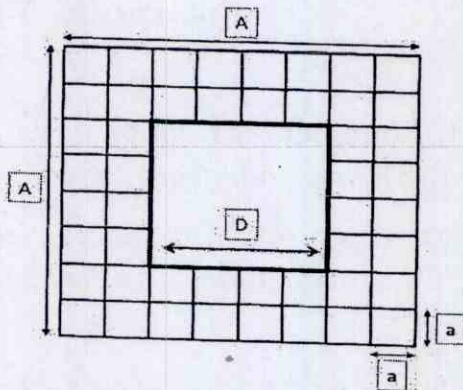
## PART - B

### (Analytical / Problem Solving Questions)

Attempt any Five questions.

(5×8=40)

1. Differentiate between the selective laser sintering process and stereo lithography with applications, benefits and drawback.
2. Find out the ratio of the time required to scan the decubing lines and outer periphery of the given slice of the object:



3. Discuss about various Fusion Deposition Modelling Materials and application of FDM.
4. Write difference between Cubic Technology's LOM and Kira's Paper Lamination Technology.
5. Describe the 3D System Stereo Lithography Apparatus's workflow.
6. After 3D geometric modeling, a user can either make a part through NC programming or through rapid prototyping. What are the basic differences between NC programming and Additive manufacturing in terms of the CAD model?
7. In a FDM process a wire of diameter 1.5 mm is used. The wire is fed with speed of 0.86 mm/sec and the area of bead deposited is 0.088 mm<sup>2</sup>. What should be the nozzle travel speed is there is no slip between the pinch rollers and wire?

## PART - C

### (Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Four questions.

(4×15=60)

1. What does SLA's recoating mean? Describe the various steps of this cycle.
2. Describe how laminated objects are made (LOM). Also mention its benefits and drawbacks as well.
3. What is "Form and Then Bond" and "Bond and Then Form" in sheet metal based additive manufacturing. Describe using appropriate instances.
4. Discuss in detail the generation of STL file format along with methodology to repair the STL file using suitable example with neat sketch.
5. Explain direct pattern making process (Quick Cast as well as Full Mold Casting).



**8E1956**

Roll No. \_\_\_\_\_

[Total No. of Pages : 2]

**8E1956****B.Tech. VIII Sem. (Main/Back) Examination, April / May - 2025****Open Elective - II****8MI6-60.2 Maintenance Management****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

*Attempt All Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

*(Mentioned in form No.205)*

**PART - A****(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. Describe the functions of maintenance systems.
2. Classify the land selectivity of failure.
3. Define the term optimum level of maintenance.
4. Describe the zero memory case.
5. Discuss the term salvage value.
6. Define the terms "Reliability".
7. State the components of maintenance cost
8. What different types of maintenance organizations are in use in Indian Industries.
9. Mention the maintenance functions.
10. Explain the term resource allocation.

## **PART - B**

### **(Analytical/Problem solving questions)**

**Attempt any Five questions.**

**(5×4=20)**

1. Define the Concepts and structure of suitable organizations for maintenance systems.
2. State the types of maintenance budget.
3. What are the importance factors considering maintenance planning.
4. State the benefits of reliability analysis in Industries.
5. What are the functions of lubrication and gives the tips on lubrication.
6. Explain the following:
  - a) Work measurement for maintenance,
  - b) Maintenance service contract.
7. Describe an effective strategy for deciding when to discard or sell low-moving spares.

## **PART - C**

### **(Descriptive/Analytical/Problem Solving/Design questions)**

**Attempt any Three questions.**

**(3×10=30)**

1. Explain the different models for various maintenance systems.
2. What are all the steps involved in preventive maintenance why preventive maintenance is better than reactive maintenance.
3. How do insurance spares with salvage value impact the total cost of inventory management? If a company holds insurance spares with a high salvage value, how should it approach stock level calculations to optimize inventory costs?
4. Explain the following:
  - a) Economics of overhaul
  - b) Major plant shut-down procedures
  - c) Replacement and reconditioning
  - d) Computerization of maintenance activities
5. What are the causes of vibration. Discuss the vibration signature analysis for organizing the preventive maintenance program.



**8E1937**

Roll No. \_\_\_\_\_

[Total No. of Pages : 2]

**8E1937****111000****B.Tech. VIII Sem. (Main/Back) Examination, April/May - 2025****Open Elective-II****8AG6 - 60.1 Energy Management****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

*Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205).*

**PART - A****(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. Define Energy.
2. What is Energy Management?
3. What do you mean by Commercial Energy?
4. Explain Energy Integration.
5. Energy Audit.
6. Discuss energy resources.
7. What are different energy sectors?
8. Describe energy pricing.
9. Write about LOW Grade Energy.
10. Explain Renewable Energy.

**PART - B**  
**(Analytical / Problem Solving Questions)**

**Attempt any Five questions.**

**(5×4=20)**

1. List the primary and secondary energy sources. Also discuss the energy scenario of India.
2. Define energy conservation, mention its importance and describe energy conservation Act - 2001.
3. List the key instruments for energy audit and explain its functions.
4. Explain in detail about "Concept of Green Buildings".
5. Discuss the Cleaner energy sources.
6. Describe the energy demand management.
7. Explain energy forecasting techniques.

**PART - C**  
**(Descriptive / Analytical / Problem Solving / Design Questions)**

**Attempt any Three questions.**

**(3×10=30)**

1. Explain different types of energy audit. Discuss in detail of about all three phases of energy audit.
  2. Write an essay on "Energy for sustainable Development".
  3. Explain different sources of Renewable energy also give its applications in different sectors.
  4. Discuss the importance of energy Management Information system (EMIS) to implement an Energy Management Programme.
  5. How the energy conservation can be made in the refrigeration and air condition based systems? Discuss in detail.
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