CENTRAL POLYTECHNIC COLLEGE,THARAMANI – 600113.

(An Autonomous Institution)

DEPARTMENT
OF
MECHANICAL ENGINEERING (SWC)

QUESTION BANK

EME61016 ADDITIVE MANUFACTURING

U.NO	Q NO	QUESTIONS
1	1	Additive Manufacturing mainly works on the principle of: (a) Removing material (b) Casting molten metal (c) Layer-by-layer material addition (d) Forging **Ans:C**
1	2	The main need for Additive Manufacturing is to: (a) Increase manual work (b) Reduce design flexibility (c) Produce complex parts quickly (d) Increase material wastage **Ans:C**
1	3	Which term is commonly used for Additive Manufacturing _____? (a) Subtractive Manufacturing (b) 3D Printing (c) Injection moulding (d) CNC Machining **Ans:B**
1	4	Additive Manufacturing started mainly for: (a) Mass production (b) Prototyping (c) Forging (d) Welding **Ans:B**
1	5	When a product is required in small quantity with frequent design changes, which process is preferred? (a) Mass production (b) Conventional machining (c) Additive Manufacturing (d) Die casting **Ans:C**
1	6	Which of the following is NOT a classification of Additive Manufacturing? (a) Vat Photopolymerization (b) Material Extrusion (c) Sand Casting (d) Powder Bed Fusion **Ans:C**
1	7	Stereolithography process uses: (a) Metal powder (b) Plastic filament (c) Liquid resin (d) Ceramic paste **Ans:C**
1	8	Which material is most commonly used in low-cost 3D printers? (a) ABS (b) PLA (c) PMMA (d) Nylon **Ans:B**
1	9	PLA is preferred because it is: (a) Toxic (b) Non-biodegradable (c) Eco-friendly (d) Metallic **Ans:C**
1	10	ABS material is known for its: (a) Low strength (b) High flexibility (c) High impact resistance (d) Solubility in water **Ans:C**

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1	11	PMMA is commonly known as: (a) Nylon (b) Acrylic (c) Teflon (d) Rubber **Ans:B**
1	12	Ceramic materials in Additive Manufacturing are mainly used for: (a) Decoration (b) High-temperature applications (c) Toys (d) Packaging **Ans:B**
1	13	Composite materials in Additive Manufacturing are used to: (a) Reduce strength (b) Improve properties (c) Increase cost only (d) Reduce accuracy **Ans:B**
1	14	Liquid resins are used in: (a) Fused Deposition Modelling (b) Stereolithography (c) Selective Laser Sintering (d) Laminated Object Manufacturing **Ans:B**
1	15	The main advantage of Additive Manufacturing is: (a) High wastage (b) Limited shapes (c) Design freedom (d) More tooling **Ans:C**
1	16	Additive Manufacturing is suitable for producing: (a) Simple parts only (b) Complex geometries (c) Flat sheets (d) Wires **Ans:B**
1	17	Which of the following is a limitation of Additive Manufacturing? (a) Design flexibility (b) Low material waste (c) Slow production rate (d) Customization **Ans:C**
1	18	Layer thickness in Additive Manufacturing affects: (a) Colour (b) Strength and finish (c) Weight only (d) Cost only **Ans:B**
1	19	Rapid Prototyping mainly helps in: (a) Mass production (b) Product testing (c) Welding (d) Painting **Ans:B**
1	20	Rapid Tooling is used to: (a) Make final products only (b) Produce moulds and dies quickly (c) Cut metals (d) Polish surfaces **Ans:B**

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1	21	Which process uses laser to fuse powder? (a) Fused Deposition Modelling (b) Stereolithography (c) Selective Laser Sintering (d) Laminated Object Manufacturing **Ans:C**
1	22	Which material is transparent and used in optical parts? (a) PLA (b) ABS (c) PMMA (d) Nylon **Ans:C**
1	23	One major challenge in Additive Manufacturing is: (a) Easy operation (b) Material limitation (c) Low design freedom (d) High wastage **Ans:B**
1	24	Rapid Prototyping reduces: (a) Design errors (b) Material strength (c) Production speed (d) Accuracy **Ans:A**
1	25	Which Additive Manufacturing process uses sheets of material? (a) Laminated Object Manufacturing (b) Selective Laser Sintering (c) Stereolithography (d) Fused Deposition Modelling **Ans:A**
1	26	Binder Jetting uses: (a) Laser (b) Electron beam (c) Liquid binder (d) Hot wire **Ans:C**
1	27	Composites in Additive Manufacturing usually contain: (a) Only plastic (b) Only metal (c) Two or more materials (d) Only ceramic **Ans:C**
1	28	PMMA Stands for: (a) Poly methyl methanol acrylate (a) Poly methyl methanol acrylate (c) Poly methacrylate material alloy (c) Poly methacrylate material alloy **Ans:B**
1	29	Post-processing in Additive Manufacturing is done to: (a) Reduce accuracy (b) Improve surface finish (c) Increase defects (d) Waste material **Ans:B**
1	30	Rapid Tooling reduces: (a) Tool life (b) Tool Development time (c) Tool Accuracy (d) Tool Strength **Ans:B**

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1	31	The biggest benefit of Additive Manufacturing in product development is: (a) High labour cost (b) Fast design-to-product cycle (c) Limited customization (d) More tooling **Ans:B**
1	32	The main need for Additive Manufacturing is to: (a) Increase manual labour (b) Reduce design flexibility (c) Produce complex parts quickly (d) Increase material wastage **Ans:C**
1	33	Additive Manufacturing is mainly useful in early stages of product development for: (a) Painting (b) Prototyping (c) Welding (d) Casting **Ans:B**
1	34	Additive Manufacturing helps industries mainly by: (a) Increasing tooling cost (b) Reducing product development time (c) Increasing material waste (d) Reducing accuracy **Ans:B**
1	35	Who is known as the inventor of Stereolithography ? (a) Elon Musk (b) Charles Hull (c) James Watt (d) Henry Ford **Ans:B**
1	36	One major reason for the growth of Additive Manufacturing in recent years is: (a) Increase in raw material cost (b) Development of low-cost desktop printers (c) Reduction in internet use (d) Decrease in automation **Ans:B**
1	37	Additive Manufacturing reduces dependence on: (a) Computer design (b) Traditional tooling (c) Electricity (d) Skilled labour **Ans:B**
1	38	The first commercial 3D printing technology was introduced in: (a) 1960s (b) 1970s (c) 1980s (d) 2000s **Ans:C**
1	39	Additive Manufacturing is especially useful for customized products because it: (a) Requires expensive moulds (b) Allows easy design modification (c) Needs large production batches (d) Has low accuracy **Ans:B**
1	40	Which of the following is a major limitation of Additive Manufacturing? (a) High design flexibility (b) Slow production rate for mass production (c) Low material wastage (d) Easy customization **Ans:B**

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1	41	A design engineer selects Fused Deposition Modelling using PLA for a prototype that will be tested indoors. The main reason for choosing PLA is: (a) High temperature resistance (b) Biodegradability and easy printing (c) High impact strength (d) Chemical resistance **Ans:B**
1	42	During printing of an ABS part, severe warping occurs. Which action best reduces this defect? (a) Increase print speed (b) Reduce bed temperature (c) Use heated bed and enclosure (d) Reduce nozzle diameter **Ans:C**
1	43	A transparent medical model is required with very fine surface finish. Which material-process combination is most appropriate? (a) PLA–Fused Deposition Modelling (b) Resin–Stereolithography (c) Nylon–Selective Laser Sintering (d) Paper–Laminated Object Manufacturing **Ans:B**
1	44	A company wants to manufacture a complex prototype quickly with minimum material waste. Which manufacturing method is most suitable? (a) Casting (b) Additive Manufacturing (c) Forging (d) Welding **Ans:B**
1	45	A prototype gear must withstand moderate load for functional testing. Which material is most suitable? (a) PLA (b) PMMA (c) ABS (d) Liquid resin **Ans:C**
1	46	A manufacturer uses Additive Manufacturing to produce mould inserts with internal cooling channels. This application is best classified as: (a) Rapid Prototyping (b) Reverse Engineering (c) Rapid Tooling (d) Mass Production **Ans:C**
1	47	A ceramic Additive Manufacturing part is chosen for high-temperature furnace applications. The main advantage of ceramics here is: (a) High ductility (b) Electrical conductivity (c) Thermal and chemical resistance (d) Low melting point **Ans:C**
1	48	Which situation best highlights the limitation of Additive Manufacturing in mass production? (a) High customization (b) Complex geometries (c) Low production speed per unit (d) Tool-free manufacturing **Ans:C**
1	49	A company uses metal Additive Manufacturing to repair worn turbine blades. This application mainly uses: (a) Binder Jetting (b) Directed Energy Deposition (DED. (c) Stereolithography (d) Laminated Object Manufacturing **Ans:B**
1	50	A design team needs to fabricate multi-material prototypes in a single build. Which am process classification is most appropriate? (a) Material Extrusion (b) Directed Energy Deposition (c) Material Jetting (d) Powder Bed Fusion **Ans:C**

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2	51	The first step in Additive Manufacturing is: (a) Printing (b) Slicing (c) CAD modeling (d) Post-processing **Ans:C**
2	52	A CAD model used for Additive Manufacturing should be: (a) Open surface model (b) Solid and watertight model (c) Hand-drawn sketch (d) 2D drawing **Ans:B**
2	53	"Watertight model" means: (a) Model is waterproof (b) No gaps or holes in geometry (c) Model is hollow (d) Model is transparent **Ans:B**
2	54	Which software is used for creating CAD models? (a) MS Word (b) AutoCAD (c) Excel (d) Notepad **Ans:B**
2	55	The most common file format for Additive Manufacturing is: (a) DOC (b) PDF (c) STL (d) TXT **Ans:C**
2	56	STL file represents a model using: (a) Curves (b) Points only (c) Triangular facets (d) Circles **Ans:C**
2	57	Which file format supports colour and texture? (a) STL (b) OBJ (c) TXT (d) DWG **Ans:B**
2	58	Part orientation mainly affects: (a) Printer size (b) Strength and surface finish (c) File name (d) Material colour **Ans:B**
2	59	Proper part orientation helps in reducing: (a) Printing speed (b) Support material (c) Accuracy (d) Resolution **Ans:B**
2	60	Overhanging parts require: (a) Extra heating (b) Support structures (c) More infill (d) More speed **Ans:B**

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2	61	Support material is mainly used to: (a) Increase weight (b) Hold unsupported regions (c) Improve colour (d) Reduce cost **Ans:B**
2	62	Which material is often used as removable support? (a) ABS (b) PLA (c) PVA (d) Nylon **Ans:C**
2	63	Model slicing means: (a) Cutting the part physically (b) Dividing model into layers (c) Painting the model (d) Enlarging the model **Ans:B**
2	64	Slicing converts a 3D model into: (a) 2D layers (b) 4D models (c) Curves (d) Points **Ans:A**
2	65	Layer thickness mainly controls: (a) Colour (b) Surface quality and time (c) Printer cost (d) File size **Ans:B**
2	66	Honeycomb structure is used to: (a) Increase material use (b) Reduce strength (c) Reduce weight and material (d) Increase printing time **Ans:C**
2	67	Honeycomb infill provides: (a) Low strength (b) High strength-to-weight ratio (c) No support (d) Solid part **Ans:B**
2	68	Which is an example of infill pattern? (a) Grid (b) Triangle (c) Honeycomb (d) All of the above **Ans:D**
2	69	Digitization means: (a) Converting physical object to digital model (b) Printing model (c) Painting model (d) Testing model **Ans:A**
2	70	Which device is used for digitization? (a) Machine (b) Scanner (c) Projector (d) Monitor **Ans:B**

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2	71	Contact digitization uses: (a) Camera (b) Probe (c) Laser (d) Light **Ans:B**
2	72	Model reconstruction is the process of: (a) Destroying model (b) Editing drawing (c) Creating 3D model from scanned data (d) Colouring part **Ans:C**
2	73	Point cloud data is obtained from: (a) CAD software (b) Slicer (c) 3D scanning (d) Printer **Ans:C**
2	74	Reverse Engineering means: (a) Designing from scratch (b) Copying drawings (c) Creating CAD model from existing part (d) Printing directly **Ans:C**
2	75	Reverse Engineering is useful when: (a) Drawing is available (b) Part is damaged (c) Physical part exists (d) Model is new **Ans:C**
2	76	Which is a major application of Reverse Engineering in Additive Manufacturing? (a) Data storage (b) Spare part development (c) Painting (d) Welding **Ans:B**
2	77	Slicing software is used to: (a) Design part (b) Control printer manually (c) Generate toolpath (d) Melt material **Ans:C**
2	78	Example of slicing software is: (a) SolidWorks (b) Cura (c) Excel (d) Photoshop **Ans:B**
2	79	G-code is generated by: (a) CAD software (b) Scanner (c) Slicer software (d) Printer motor **Ans:C**
2	80	G-code contains information about: (a) Colour (b) Printer movement and speed (c) Material type only (d) Cost **Ans:B**

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2	81	Increasing infill density will: (a) Reduce strength (b) Increase strength and time (c) Reduce cost (d) Reduce accuracy **Ans:B**
2	82	Orientation parallel to load direction gives: (a) Low strength (b) High strength (c) No effect (d) More defects **Ans:B**
2	83	Support removal is done after: (a) CAD modeling (b) Slicing (c) 3D Printing (d) Scanning **Ans:C**
2	84	Automatic support generation is done by: (a) Printer (b) Scanner (c) Slicer software (d) Operator only **Ans:C**
2	85	Reverse Engineering combined with Additive Manufacturing helps in: (a) Faster product duplication (b) Increased wastage (c) Low accuracy (d) More tooling **Ans:A**
2	86	Digitized data without processing is called: (a) CAD model (b) G-code (c) Point cloud (d) STL **Ans:C**
2	87	The main benefit of slicing software is: (a) Designing models (b) Improving scanning (c) Converting model to printable form (d) Painting parts **Ans:C**
2	88	Which device is commonly used for Reverse Engineering in Additive Manufacturing? (a) Vernier caliper (b) Laser scanner (c) Multimeter (d) Thermometer **Ans:B**
2	89	Reverse Engineering is mainly used in Additive Manufacturing for: (a) Increasing weight of parts (b) Copying and redesigning existing parts (c) Reducing temperature (d) Improving colour **Ans:B**
2	90	Point cloud data is obtained from: (a) CNC machine (b) 3D scanner (c) Furnace (d) Compressor **Ans:B**

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2	91	While exporting a CAD model for 3D printing, which file format best preserves surface geometry? (a) DOC (b) STL (c) XLS (d) TXT **Ans:B**
2	92	During slicing, reducing layer height mainly improves: (a) Printing speed (b) Mechanical strength only (c) Surface finish and accuracy (d) Infill percentage **Ans:C**
2	93	A scanned mechanical component contains missing surface data. Which step is required before printing? (a) File conversion (b) Model reconstruction (c) Re-slicing (d) Toolpath generation **Ans:B**
2	94	A complex component with internal cavities is to be digitized. The best technique is: (a) Contact scanning (b) Laser scanning (c) Manual measurement (d) Drafting **Ans:B**
2	95	A company uses reverse engineering to redesign a damaged mould. The first step is: (a) Toolpath generation (b) Testing (c) Printing (d) 3D scanning **Ans:D**
2	96	A student converts a STEP file into STL before printing. The main purpose is to: (a) Improve colour quality (b) Convert solid model into triangular mesh (c) Reduce file size only (d) Increase accuracy automatically **Ans:B**
2	97	A designer wants faster printing without major strength loss. Which infill pattern is most suitable? (a) Solid (b) Honeycomb (c) Lines (d) Concentric **Ans:B**
2	98	In reverse engineering of legacy parts, Additive Manufacturing is mainly used to: (a) Replace skilled workers (b) Reproduce obsolete components (c) Reduce software cost (d) Eliminate inspection **Ans:B**
2	99	A part with a large overhang is failing during printing. What is the best solution? (a) Reduce infill (b) Add support structures (c) Increase colour density (d) Reduce model size **Ans:B**
2	100	Proper part orientation mainly helps to: (a) Increase cost (b) Reduce material and time (c) Reduce accuracy (d) Increase errors **Ans:B**

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3	101	In Fused Deposition Modelling, the raw material is supplied in the form of: (a) Powder (b) Liquid resin (c) Filament (d) Sheet **Ans:C**
3	102	Which part of Fused Deposition Modelling machine melts the filament? (a) Build platform (b) Extruder nozzle (c) Cooling fan (d) Guide tube **Ans:B**
3	103	The main working principle of Fused Deposition Modelling is based on: (a) Laser sintering (b) Extrusion and deposition of molten material (c) Chemical curing (d) Sheet lamination **Ans:B**
3	104	If the nozzle temperature is set too low in Fused Deposition Modelling, the result will be: (a) Smooth layers (b) Poor layer bonding (c) Faster printing (d) High strength **Ans:B**
3	105	Which parameter mainly controls the surface finish in Fused Deposition Modelling? (a) Layer thickness (b) Infill density (c) Bed temperature (d) Print time **Ans:A**
3	106	For improving strength of an Fused Deposition Modelling part, which setting should be increased? (a) Print speed (b) Support angle (c) Fan speed (d) Infill percentage **Ans:D**
3	107	In Fused Deposition Modelling, support material is mainly used to: (a) Increase weight (b) Improve colour (c) Support overhanging parts (d) Reduce cost **Ans:C**
3	108	If warping occurs in Fused Deposition Modelling prints, it can be reduced by: (a) Increasing print speed (b) Lowering bed temperature (c) Increasing bed temperature (d) Turning off heater **Ans:C**
3	109	In Laminated Object Manufacturing, parts are made by joining: (a) Liquid layers (b) Powder layers (c) Sheet layers (d) Wire layers **Ans:C**
3	110	Which energy source is used in Laminated Object Manufacturing for cutting layers? (a) Plasma arc (b) Laser beam (c) Water jet (d) Gas flame **Ans:B**

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3	111	The bonding of sheets in Laminated Object Manufacturing is achieved mainly by: (a) Adhesive bonding (b) Riveting (c) Welding (d) Screwing **Ans:A**
3	112	Which material is commonly used in Laminated Object Manufacturing? (a) Nylon powder (b) Paper sheets (c) Metal wire (d) Liquid resin **Ans:B**
3	113	If weak bonding occurs in Laminated Object Manufacturing parts, the possible reason is: (a) High laser power (b) Poor adhesive application (c) High temperature (d) Excess pressure **Ans:B**
3	114	One major advantage of Laminated Object Manufacturing is: (a) High accuracy (b) Low material cost (c) High transparency (d) High surface finish **Ans:B**
3	115	Laminated Object Manufacturing is best suited for making: (a) Medical implants (b) Optical lenses (c) Micro parts (d) Large conceptual models **Ans:D**
3	116	The main purpose of adhesive in Laminated Object Manufacturing is to: (a) Cut sheets (b) Join successive layers (c) Melt material (d) Cool parts **Ans:B**
3	117	If excess adhesive is applied in Laminated Object Manufacturing, it may result in: (a) Better accuracy (b) Distortion of part (c) Faster cutting (d) Higher strength **Ans:B**
3	118	Which factor affects adhesive bonding strength most? (a) Colour of sheet (b) Surface cleanliness (c) Printer brand (d) Room size **Ans:B**
3	119	Proper curing of adhesive in Laminated Object Manufacturing is required to: (a) Improve bonding strength (b) Increase weight (c) Reduce printing time (d) Improve colour **Ans:A**
3	120	PolyJet works similar to: (a) Inkjet printing (b) Laser cutting (c) CNC milling (d) Sand casting **Ans:A**

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3	121	In PolyJet, material is deposited in the form of: (a) Powder (b) Filament (c) Liquid droplets (d) Solid sheets **Ans:C**
3	122	Which method is used to solidify material in PolyJet? (a) Heating (b) Cooling (c) UV curing (d) Air drying **Ans:C**
3	123	An important advantage of PolyJet is: (a) Low cost (b) Multi-material printing (c) High strength only (d) Large build size **Ans:B**
3	124	PolyJet is mainly used for: (a) Structural parts (b) Functional metal parts (c) High-detail prototypes (d) Large moulds **Ans:C**
3	125	A student wants to print a low-cost large model quickly. Which process is suitable? (a) PolyJet (b) Selective Laser Sintering (c) Laminated Object Manufacturing (d) Stereolithography **Ans:C**
3	126	For making a multi-colour prototype with fine details, choose: (a) Fused Deposition Modelling (b) Laminated Object Manufacturing (c) PolyJet (d) Electron Beam Melting **Ans:C**
3	127	Which component feeds filament into the hot end in Fused Deposition Modelling? (a) Cooling fan (b) Drive gear (Feeder) (c) Build plate (d) Controller **Ans:B**
3	128	In Fused Deposition Modelling, stepper motors are mainly used to: (a) Heat nozzle (b) Move print head and bed (c) Supply material (d) Cool layers **Ans:B**
3	129	Which part ensures proper adhesion of first layer in Fused Deposition Modelling? (a) Extruder motor (b) Heated bed (c) End stop switch (d) Power supply **Ans:B**
3	130	In Laminated Object Manufacturing, the roller assembly is used to: (a) Cut sheets (b) Apply pressure and bond layers (c) Cool layers (d) Remove waste **Ans:B**

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3	131	Which component supplies sheets in Laminated Object Manufacturing? (a) Sheet feeding roller (b) Powder hopper (c) Extruder (d) Resin tank **Ans:A**
3	132	The waste removal system in Laminated Object Manufacturing is used to: (a) Clean adhesive (b) Supply glue (c) Cool sheets (d) Remove excess laminated material **Ans:D**
3	133	The laser unit in Laminated Object Manufacturing is mainly responsible for: (a) Bonding layers (b) Colouring parts (c) Melting adhesive (d) Cutting contours **Ans:D**
3	134	The heating element in Laminated Object Manufacturing is used to: (a) Activate adhesive (b) Dry sheets (c) Cut layers (d) Harden part **Ans:A**
3	135	In Laminated Object Manufacturing machines, the build platform moves mainly in: (a) X-direction (b) Y-direction (c) Z-direction (d) Circular path **Ans:C**
3	136	The print head in PolyJet contains: (a) Heating coils (b) Inkjet nozzles (c) Laser mirrors (d) Cutting blades **Ans:B**
3	137	The function of the support material tank in PolyJet is to: (a) Store liquid resin (b) Store cleaning fluid (c) Store support resin (d) Store water **Ans:C**
3	138	Which component controls droplet size in PolyJet? (a) Stepper motor (b) Nozzle diameter (c) Heater block (d) Platform screw **Ans:B**
3	139	In PolyJet printers, the material cartridges are mainly used to: (a) Store filament (b) Store liquid photopolymer (c) Store powder (d) Store adhesive **Ans:B**
3	140	In PolyJet technology, solidification of printed material occurs due to: (a) Air cooling (b) Chemical reaction (c) UV light curing of photopolymer droplets (d) High pressure **Ans:C**

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3	141	In Laminated Object Manufacturing, uneven bonding between layers results in delamination. Which factor is responsible? (a) Low laser power (b) Insufficient adhesive activation (c) High scan speed (d) High cutting temperature **Ans:B**
3	142	If nozzle diameter in Fused Deposition Modelling is reduced, what is the MOST likely result? (a) Lower accuracy (b) Higher surface roughness (c) Better resolution (d) Faster printing **Ans:C**
3	143	Warping in Fused Deposition Modelling-printed ABS parts can be reduced mainly by: (a) Increasing fan speed (b) Using a heated bed (c) Reducing infill (d) Increasing nozzle size **Ans:B**
3	144	A designer selects Laminated Object Manufacturing for producing large conceptual models mainly because it: (a) Gives high accuracy (b) Uses low-cost sheet material (c) Produces metal parts (d) Requires no post-processing **Ans:B**
3	145	A PolyJet part shows incomplete curing. Which factor should be checked first? (a) Nozzle diameter (b) UV lamp intensity (c) Layer height (d) Bed leveling **Ans:B**
3	146	In Laminated Object Manufacturing, unwanted material around the part is removed mainly by: (a) Melting (b) Peeling (c) Cutting (d) Dissolving **Ans:C**
3	147	In Laminated Object Manufacturing, laser cutting mainly helps to: (a) Heat sheets (b) Shape each layer profile (c) Cure adhesive (d) Improve colour **Ans:B**
3	148	Which PolyJet feature helps in producing rubber-like and rigid parts together? (a) High bed temperature (b) Multi-jet print heads (c) Large nozzle size (d) Powder recycling **Ans:B**
3	149	Select the odd one out based on Fused Deposition Modelling printer construction components: (a) Filament spool (b) Heated nozzle (c) Powder bed (d) Extruder motor **Ans:C**
3	150	Select the odd one out based on PolyJet printer construction: (a) Inkjet-style print heads (b) UV curing lamp (c) Liquid photopolymer cartridge (d) Heated build chamber for powder **Ans:D**

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4	151	The basic principle involved in Stereolithography is: (a) Thermal melting of powder (b) Photopolymerization of liquid resin (c) Mechanical compaction (d) Adhesive bonding **Ans:B**
4	152	Which component in an Stereolithography machine contains the photopolymer resin? (a) Powder bed (b) Resin vat (c) Feed hopper (d) Build nozzle **Ans:B**
4	153	The light source commonly used in Stereolithography is: (a) Infrared lamp (b) Electron beam (c) Ultraviolet (UV) laser (d) Plasma arc **Ans:C**
4	154	Which material is specifically suitable for Stereolithography? (a) Nylon powder (b) Titanium alloy (c) Photo-curable resin (d) ABS filament **Ans:C**
4	155	Stereolithography produces parts with: (a) Visible layer lines (b) Brittleness (c) Smooth surface finish (d) High porosity **Ans:C**
4	156	Layer thickness in Stereolithography is controlled primarily by: (a) Resin colour (b) Platform movement (c) Laser wavelength (d) Vat size **Ans:B**
4	157	Stereolithography is preferred when parts require: (a) High dimensional accuracy (b) Limited mechanical strength (c) Low Strength (d) Rough surface finish **Ans:A**
4	158	Selective Laser Sintering uses material in the form of: (a) Liquid resin (b) Sheet material (c) Powder (d) Wire **Ans:C**
4	159	The heat source used in Selective Laser Sintering is typically a: (a) UV laser (b) CO_2 laser (c) Electron beam (d) Induction heater **Ans:B**
4	160	In Selective Laser Sintering, the powder particles are bonded by: (a) Complete melting (b) Sintering (c) Chemical curing (d) Adhesive bonding **Ans:B**

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4	161	A major advantage of Stereolithography over Selective Laser Sintering is: (a) Higher part strength (b) Better surface finish (c) Ability to process metals (d) No need for supports **Ans:B**
4	162	One major advantage of Selective Laser Sintering is: (a) High surface finish (b) Requirement of support structures (c) No need for external supports (d) Limited material strength **Ans:C**
4	163	In Selective Laser Sintering, un-sintered powder acts as: (a) Waste (b) Cooling medium (c) Support material (d) Lubricant **Ans:C**
4	164	Compared to Stereolithography, Selective Laser Sintering parts are generally: (a) More brittle (b) Stronger and functional (c) Transparent (d) Less accurate **Ans:B**
4	165	The energy source used in Electron Beam Melting is: (a) Laser beam (b) Plasma arc (c) Electron beam (d) UV light **Ans:C**
4	166	Electron Beam Melting is carried out in a: (a) Open atmosphere (b) Inert gas chamber (c) Vacuum chamber (d) Water-filled chamber **Ans:C**
4	167	Which material is best suited for Electron Beam Melting? (a) ABS plastic (b) Nylon (c) Titanium alloy (d) Epoxy resin **Ans:C**
4	168	A key advantage of Electron Beam Melting is: (a) Low operating temperature (b) High density and strength of parts (c) Smooth surface finish (d) Low equipment cost **Ans:B**
4	169	Electron Beam Melting is commonly used in: (a) Toy manufacturing (b) Packaging industry (c) Medical implants (d) Plastic prototyping **Ans:C**
4	170	Compared to Selective Laser Sintering, Electron Beam Melting operates at: (a) Lower temperature (b) Higher temperature (c) Same temperature (d) Room temperature **Ans:B**

U.NO	Q NO	QUESTIONS
4	171	Electron Beam Melting process is mainly suitable for: (a) Polymers (b) Ceramics (c) Metals (d) Composites **Ans:C**
4	172	Why is a high vacuum essential in the Electron Beam Melting process? (a) To cool the molten pool rapidly (b) To prevent oxidation and electron scattering (c) To improve powder flow (d) To reduce build time **Ans:B**
4	173	Electron Beam Melting is NOT suitable for: (a) Medical implants (b) Aerospace parts (c) Polymers (d) Titanium components **Ans:C**
4	174	A key advantage of Electron Beam Melting is: (a) Very smooth surface finish (b) Ability to process polymers (c) Low residual stress parts (d) Low equipment cost **Ans:C**
4	175	The energy source in Electron Beam Melting is: (a) Fiber laser (b) CO_2 laser (c) Electron beam (d) Plasma arc **Ans:C**
4	176	Which atmosphere is used in Electron Beam Melting? (a) Argon (b) Nitrogen (c) Air (d) Vacuum **Ans:D**
4	177	A major limitation of Electron Beam Melting is: (a) Slow scanning (b) Limited material variety (c) High oxidation (d) Low build temperature **Ans:B**
4	178	Laser Engineered Net Shaping belongs to which Additive Manufacturing category? (a) Vat photopolymerization (b) Powder bed fusion (c) Directed energy deposition (d) Material jetting **Ans:C**
4	179	The main heat source in Laser Engineered Net Shaping is: (a) Electron beam (b) Plasma arc (c) Laser beam (d) Induction coil **Ans:C**
4	180	Laser Engineered Net Shaping is especially suitable for: (a) Mass production of small parts (b) Repair and cladding (c) Polymer printing (d) High-resolution micro parts **Ans:B**

U.NO	Q NO	QUESTIONS
4	181	The typical atmosphere used in Laser Engineered Net Shaping is: (a) Vacuum (b) Air (c) Inert gas (d) Oxygen-rich **Ans:C**
4	182	A major advantage of Laser Engineered Net Shaping over Electron Beam Melting is: (a) Lower residual stress (b) Ability to repair parts (c) Higher vacuum quality (d) Better surface finish **Ans:B**
4	183	Typical substrate used in Laser Engineered Net Shaping is: (a) Polymer plate (b) Ceramic tile (c) Metal base plate or component (d) Glass sheet **Ans:C**
4	184	Which Additive Manufacturing process is most suitable for medical implants made of titanium? (a) Stereolithography (b) Selective Laser Sintering (c) Electron Beam Melting (d) Fused Deposition Modelling **Ans:C**
4	185	Transparency is a characteristic feature of: (a) Selective Laser Sintering - nylon parts (b) Electron Beam Melting - titanium parts (c) Stereolithography - resin parts (d) Laser Engineered Net Shaping - metal parts **Ans:C**
4	186	What is the main advantage of Selective Laser Sintering ? (a) Produces strong functional parts (b) Rough surface finish (c) Inability to produce complex shapes (d) Low accuracy **Ans:A**
4	187	Selective Laser Sintering parts usually do not require support structures because: (a) The laser power is low (b) The build temperature is low (c) Surrounding powder supports the part (d) Parts are self-supporting by design **Ans:C**
4	188	In Stereolithography, the build platform moves: (a) Horizontally only (b) Vertically only (c) In circular motion (d) Randomly **Ans:B**
4	189	The material vat in Stereolithography is filled with: (a) Thermoplastic powder (b) Metal powder (c) Photopolymer resin (d) Ceramic slurry **Ans:C**
4	190	In Selective Laser Sintering, the powder bed is spread using a: (a) Roller or blade (b) Nozzle (c) Resin pump (d) Electron lens **Ans:A**

U.NO	Q NO	QUESTIONS
4	191	Which component in Selective Laser Sintering supports overhanging structures? (a) Support rods (b) Build platform (c) Unsintered powder (d) Fixtures **Ans:C**
4	192	The powder spreading mechanism in Electron Beam Melting is similar to: (a) Stereolithography (b) Fused Deposition Modelling (c) Selective Laser Sintering (d) Laser Engineered Net Shaping **Ans:C**
4	193	Laser Engineered Net Shaping differs from powder-bed systems because it: (a) Uses liquid resin (b) Uses a vacuum chamber (c) Deposits material only where needed (d) Requires support structures always **Ans:C**
4	194	The shielding environment in Laser Engineered Net Shaping is provided by: (a) Vacuum (b) Oxygen (c) Inert gas flow (d) Water cooling **Ans:C**
4	195	The electron beam in Electron Beam Melting melts powder by converting: (a) Light energy to heat (b) Electrical energy to heat (c) Kinetic energy of electrons to heat (d) Chemical energy to heat **Ans:C**
4	196	In Laser Engineered Net Shaping, material deposition occurs when: (a) Resin solidifies (b) Powder is glued (c) Powder is melted in a laser-generated melt pool (d) Sheets are bonded **Ans:C**
4	197	Laser Engineered Net Shaping allows repair of parts because it: (a) Uses resin curing (b) Builds inside powder bed (c) Deposits material directly on components (d) Uses vacuum environment **Ans:C**
4	198	Which process forms layers by selectively curing liquid material? (a) Selective Laser Sintering (b) Electron Beam Melting (c) Laser Engineered Net Shaping (d) Stereolithography **Ans:D**
4	199	Why is Selective Laser Sintering suitable for making interlocking and moving parts in one build? (a) No need for supports (b) High build speed (c) Low accuracy (d) Uses liquid resin **Ans:A**
4	200	In Electron Beam Melting, scanning of the beam is achieved by: (a) Rotating mirrors (b) Mechanical arms (c) Electromagnetic deflection (d) Fiber optics **Ans:C**

U.NO	Q NO	QUESTIONS
5	201	Additive Manufacturing helps in new product development mainly by: (a) Increasing production time (b) Reducing design cycle time (c) Increasing cost (d) Reducing accuracy **Ans:B**
5	202	Rapid prototyping in Additive Manufacturing is used to: (a) Manufacture final products only (b) Test and evaluate product design (c) Increase waste (d) Improve colour **Ans:B**
5	203	Which stage of product development benefits most from Additive Manufacturing? (a) Concept and prototype stage (b) Packaging (c) Marketing (d) Distribution **Ans:A**
5	204	Additive Manufacturing allows designers to: (a) Modify designs easily (b) Limit creativity (c) Avoid testing (d) Increase material waste **Ans:A**
5	205	A prototype made using Additive Manufacturing is mainly used for: (a) Decoration (b) Performance testing (c) Painting (d) Storage **Ans:B**
5	206	Additive Manufacturing is useful in after-sales service for: (a) Mass advertising (b) Manufacturing spare parts on demand (c) Reducing warranty (d) Increasing delay **Ans:B**
5	207	On-demand manufacturing reduces: (a) Production speed (b) Strength (c) Product quality (d) Inventory cost **Ans:D**
5	208	Additive Manufacturing helps in maintenance by: (a) Delaying repairs (b) Printing replacement parts quickly (c) Increasing downtime (d) Increasing cost **Ans:B**
5	209	Digital inventory means: (a) Storing physical parts (b) Storing tools (c) Storing CAD files of parts (d) Storing raw materials **Ans:C**
5	210	In automobile industry, Additive Manufacturing is mainly used for: (a) Fuel production (b) Prototyping and tooling (c) Painting vehicles (d) Transport **Ans:B**

U.NO	Q NO	QUESTIONS
5	211	Which auto part is commonly made using Additive Manufacturing for testing? (a) Tyres (b) Battery (c) Windshield (d) Intake manifold **Ans:D**
5	212	Additive Manufacturing helps reduce vehicle weight by: (a) Increasing thickness (b) Making optimized lightweight structures (c) Using more material (d) Adding layers **Ans:B**
5	213	Aerospace industry prefers Additive Manufacturing mainly because of: (a) Low strength (b) Lightweight and complex parts (c) High waste (d) Low accuracy **Ans:B**
5	214	Customized car interiors can be made using: (a) Casting (b) Additive Manufacturing (c) Forging (d) Welding **Ans:B**
5	215	Which aerospace part is suitable for Additive Manufacturing? (a) Window glass (b) Turbine blade prototype (c) Seat cover (d) Carpet **Ans:B**
5	216	Additive Manufacturing reduces material waste in aerospace by: (a) Subtractive machining (b) Forging (c) Casting (d) Near-net shape manufacturing **Ans:D**
5	217	Which material is commonly used in aerospace Additive Manufacturing? (a) Wood (b) Titanium alloy (c) Rubber (d) Paper **Ans:B**
5	218	Additive Manufacturing is used in consumer products mainly for: (a) Mass production (b) Customization (c) Mining (d) Farming **Ans:B**
5	219	Customized mobile covers are made using: (a) Casting (b) Injection moulding (c) Additive Manufacturing (d) Forging **Ans:C**
5	220	Which product is suitable for Additive Manufacturing? (a) Millions of identical bottles (b) Personalized jewelry (c) Cement bags (d) Steel rods **Ans:B**

U.NO	Q NO	QUESTIONS
5	221	Additive Manufacturing helps companies by: (a) Offering personalized products (b) Reducing customer choice (c) Increasing delivery time (d) Reducing design **Ans:A**
5	222	Additive Manufacturing in healthcare is mainly used for: (a) Food processing (b) Medical devices and implants (c) Textile making (d) Painting **Ans:B**
5	223	Customized implants are made using Additive Manufacturing because: (a) All patients are same (b) Every patient has different anatomy (c) It is cheaper always (d) It is slower **Ans:B**
5	224	Which medical product is made using Additive Manufacturing? (a) Syringe needle (b) Dental crowns (c) Cotton bandage (d) Tablets **Ans:B**
5	225	CT and MRI scan data is used in Additive Manufacturing to: (a) Design patient-specific models (b) Colour parts (c) Increase speed (d) Reduce accuracy **Ans:A**
5	226	Bioprinting is used to: (a) Print metals (b) Print living tissues (c) Print plastics (d) Print papers **Ans:B**
5	227	Bio-inks are mainly composed of: (a) Cement (b) Living cells and biomaterials (c) Oil (d) Plastic **Ans:B**
5	228	Scaffold structures in bio-printing help in: (a) Colouring tissues (b) Supporting cell growth (c) Heating cells (d) Cutting tissues **Ans:B**
5	229	Customized prosthetic limbs are made using Additive Manufacturing because: (a) Low strength (b) Exact fit to patient (c) Heavy weight (d) High waste **Ans:B**
5	230	A discontinued spare part is required urgently. Best solution: (a) Import (b) Additive Manufacturing printing (c) Mass production (d) Forging **Ans:B**

U.NO	Q NO	QUESTIONS
5	231	A patient needs a skull implant. Best method: (a) Sand casting (b) Forging (c) Welding (d) Additive Manufacturing with CT data **Ans:D**
5	232	Digital manufacturing mainly means: (a) Manual drawing (b) Using CAD + Additive Manufacturing (c) Paper design (d) Hand tools **Ans:B**
5	233	Additive Manufacturing helps startups mainly by: (a) Increasing investment (b) Reducing development cost (c) Increasing labour (d) Increasing delay **Ans:B**
5	234	Patient-specific hearing aids are made using: (a) Injection moulding (b) Casting (c) Additive Manufacturing (d) Rolling **Ans:C**
5	235	A company uses Additive Manufacturing to make trial models before mass production. This application is called: (a) Reverse engineering (b) Rapid prototyping (c) Mass customization (d) Tooling **Ans:B**
5	236	Which application of Additive Manufacturing helps reduce downtime in industries? (a) New product design (b) Packaging (c) Marketing (d) On-demand spare part printing **Ans:D**
5	237	A customized bicycle handle is produced using Additive Manufacturing mainly due to: (a) Low strength (b) Easy personalization (c) High waste (d) Slow speed **Ans:B**
5	238	Which Additive Manufacturing application helps in reducing warehouse space? (a) Physical inventory (b) Digital inventory (c) Manual storage (d) Open storage **Ans:B**
5	239	Additive Manufacturing is preferred for low-volume production because it: (a) Requires expensive moulds (b) Has low setup cost (c) Needs more workers (d) Takes more time **Ans:B**
5	240	3D printing of customized dental aligners is an example of Additive Manufacturing use in: (a) Automobile industry (b) Aerospace industry (c) Healthcare industry (d) Textile industry **Ans:C**

U.NO	Q NO	QUESTIONS
5	241	A company uses Additive Manufacturing to quickly test multiple design concepts before final production. This application mainly belongs to: (a) Mass production (b) New product development (c) Recycling (d) Packaging **Ans:B**
5	242	A discontinued spare part is produced using Additive Manufacturing for customer repair. This belongs to: (a) New product design (b) Mass production (c) After-sales service (d) Advertising **Ans:C**
5	243	In aerospace industries, Additive Manufacturing is mainly preferred for critical parts because it: (a) Increases part weight (b) Enables lightweight complex structures (c) Reduces accuracy (d) Increases assembly steps **Ans:B**
5	244	A patient-specific hip implant made using Additive Manufacturing mainly improves: (a) Fit and comfort (b) Production speed only (c) Colour appearance (d) Packaging quality **Ans:A**
5	245	Which Additive Manufacturing application helps reduce inventory in automobile service centers? (a) Bulk manufacturing (b) On-demand spare parts (c) Traditional casting (d) Injection moulding **Ans:B**
5	246	A consumer electronics company uses Additive Manufacturing to produce customized phone cases. This shows: (a) Mass standardization (b) Mass customization (c) Centralized production (d) Batch processing **Ans:B**
5	247	Bio-printing of organs mainly depends on Additive Manufacturing's ability to: (a) Use metal powders (b) Print living cells layer by layer (c) Increase printing temperature (d) Reduce curing time **Ans:B**
5	248	Aerospace companies use Additive Manufacturing to reduce part count mainly because: (a) Additive Manufacturing produces weak parts (b) Additive Manufacturing enables part consolidation (c) Additive Manufacturing is cheaper than casting (d) Additive Manufacturing eliminates testing **Ans:B**
5	249	Printing dental crowns using Additive Manufacturing mainly helps in: (a) Increasing production time (b) Improving patient-specific fitting (c) Reducing strength (d) Increasing waste **Ans:B**
5	250	A startup uses Additive Manufacturing to launch new products quickly in the market. This is mainly due to: (a) High labour requirement (b) Rapid prototyping capability (c) Slow production rate (d) Limited materials **Ans:B**

PART B & PART C

NOTE:
PART B – 3 MARKS QUESTIONS
PART C – 10 MARKS QUESTIONS

PART B/C	UNIT NO	Q.NO	QUESTION
B	1	1	Define Additive Manufacturing and explain its need in modern industries.
B	1	2	Briefly explain the historical development of Additive Manufacturing.
B	1	3	Write the basic working principle of Additive Manufacturing.
B	1	4	Write short notes on PLA and ABS materials used in Additive Manufacturing.
B	1	5	Write short notes on PMMA and liquid resins used in Additive Manufacturing.
B	1	6	What are composite materials in Additive Manufacturing? Mention their advantages.
B	1	7	Discuss the term Rapid Prototyping and its importance.
B	1	8	Describe Rapid Tooling with one industrial application.
B	1	9	State any three advantages of Additive Manufacturing.
B	1	10	Mention any three limitations of Additive Manufacturing.
B	2	1	Discuss the basic concept of CAD model preparation for Additive Manufacturing.
B	2	2	List the file formats used in Additive Manufacturing.
B	2	3	What is part orientation? Explain its effect on print quality.
B	2	4	Write the purpose of support material in 3D printing.
B	2	5	What is meant by model reconstruction in Reverse engineering?
B	2	6	What is model slicing? Why is it necessary in Additive Manufacturing?
B	2	7	What are digitization techniques? Mention any two methods.
B	2	8	List the steps involved in model reconstruction.
B	2	9	What is slicing software? Give two examples.
B	2	10	Write any two applications of Reverse Engineering in Additive Manufacturing.
B	3	1	Write the construction of a Fused Deposition Modelling machine.
B	3	2	List any three advantages of Fused Deposition Modelling.
B	3	3	List any three important process parameters involved in Fused Deposition Modelling.

B	3	4	Draw Fused Deposition Modelling equipment and name its parts.
B	3	5	Outline the construction of Laminated Object Manufacturing system.
B	3	6	Draw Laminated Object Manufacturing machine and name its parts.
B	3	7	List any three advantages of Laminated Object Manufacturing.
B	3	8	Discuss about gluing and adhesive bonding in Laminated Object Manufacturing process.
B	3	9	Describe the working principle of PolyJet technology.
B	3	10	List any three advantages of PolyJet process.
B	4	1	Outline the construction of a Stereolithography machine.
B	4	2	Draw Stereolithography machine and name its parts.
B	4	3	What are photo-curable materials used in Stereolithography? Give examples.
B	4	4	Draw Selective Laser Sintering machine and name its parts.
B	4	5	Describe the working principle of Selective Laser Sintering process.
B	4	6	List any three advantages of Selective Laser Sintering.
B	4	7	Outline the construction of Electron Beam Melting machine.
B	4	8	List any three advantages of Electron Beam Melting.
B	4	9	Draw Laser Engineered Net Shaping equipment and name its parts.
B	4	10	Compare Selective Laser Sintering and Electron Beam Melting processes based on energy source and applications.
B	5	1	Describe the role of Additive Manufacturing in new product development.
B	5	2	Discuss the use of Additive Manufacturing in after-sales service and maintenance.
B	5	3	What is meant by digital inventory ?and highlight its importance in Additive Manufacturing.
B	5	4	Describe the application of Additive Manufacturing in the automobile industry.
B	5	5	Illustrate how Additive Manufacturing helps in reducing the weight of automotive parts.
B	5	6	Highlight the importance of Additive Manufacturing in the aerospace industry.
B	5	7	Discuss how Additive Manufacturing is used to manufacture complex aerospace

			components.
B	5	8	Describe the application of Additive Manufacturing in the consumer products industry.
B	5	9	Outline the use of Additive Manufacturing in the healthcare sector.
B	5	10	Highlight the advantages of Additive Manufacturing in medical applications.
C	1	1	Describe Additive Manufacturing in detail. Explain its need, history, and basic working principles.
C	1	2	Classify the different Additive Manufacturing processes and briefly explain the working principle and applications of each process.
C	1	3	Explain the materials used in Additive Manufacturing, such as PLA, ABS, PMMA, ceramics, composites, and liquid resins.
C	1	4	Discuss the advantages, limitations, and challenges of Additive Manufacturing.
C	1	5	Explain the concepts of Rapid Prototyping and Rapid Tooling in detail.
C	2	1	Describe the basic concept of CAD model preparation for Additive Manufacturing. Also discuss briefly about file formats and part orientation.
C	2	2	Explain the process of model slicing and List the slicing softwares available and Discuss how honeycomb (infill) structures improve part strength and reduce material usage.
C	2	3	Discuss digitization techniques and model reconstruction in Reverse Engineering. List at least two methods used to capture geometry of existing parts.
C	2	4	Define Reverse Engineering and explain its applications in Additive Manufacturing.
C	2	5	Describe the complete workflow from CAD model preparation to final Additive Manufacturing part using RE techniques.
C	3	1	Explain the Construction and working principle of Fused Deposition Modelling with neat sketch.
C	3	2	Explain the Construction, working principle and advantages of Laminated Object Manufacturing with neat sketch.
C	3	3	Discuss in detail about the Construction and working principle of PolyJet with suitable diagram.
C	3	4	List advantages of Fused Deposition Modelling, Laminated Object Manufacturing and PolyJet technology. Also briefly discuss about adhesive bonding.

C	3	5	Compare Fused Deposition Modelling, Laminated Object Manufacturing and PolyJet based on construction, energy source and material type.
C	4	1	Explain the Construction, working principle of Stereolithography with suitable diagram.
C	4	2	Explain the Construction, working principle of Selective Laser Sintering with neat sketch.
C	4	3	Discuss in detail about the Construction and working principle of Electron Beam Melting with neat sketch.
C	4	4	Explain the Construction and working principle of Laser Engineered Net Shaping with suitable sketch.
C	4	5	Compare Stereolithography, Selective Laser Sintering and Electron Beam Melting based on construction, energy source and material type.
C	5	1	Discuss the role of Additive Manufacturing in new product development.
C	5	2	Explain how Additive Manufacturing supports after-sales service and maintenance.
C	5	3	Describe the applications of Additive Manufacturing in the automobile industry. Explain the advantages of using Additive Manufacturing in automotive design and manufacturing.
C	5	4	Explain the use of Additive Manufacturing in the aerospace industry. Highlight the advantages of Additive Manufacturing for aerospace manufacturing.
C	5	5	Discuss the applications of Additive Manufacturing in healthcare. Explain how 3D printing is used for patient-specific devices and bioprinting.