

ME-1881(A)
Examination –May-2022
B.Tech. VIII Sem : Mechanical Engineering
Additive Manufacturing

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

Word limit be observed as follows:

Part a – Max 50 words, Part b – Max 50 words,

Part c – Max 100 words and Part d – Max 400 words.

Word limit NOT to be followed for diagram, numerical, derivation.

- Q.1 (a) What is the reason for the evolution of Additive Manufacturing (AM) process? 02
 (b) How AM is different than conventional manufacturing? 02
 (c) Write the steps of AM process. 03
 (d) What are the characteristics of AM process? Explain. 07

OR

What is STL file? How STL errors may be removed? 07

- Q.2 (a) What is the significance of Stereolithography? 02
 (b) What is the basic principle of FDM process? 02
 (c) How can you apply LOM process? 03
 (d) Explain Fused Deposition Modelling (FDM) process of AM in details with schematic diagram. 07

OR

What are the key differences between the various AM processes? What are the advantages of each? 07

- Q.3 (a) Explain DFMA concept and its objectives. 02
 (b) What do you know about design for AM? 02
 (c) Write a note on design freedom in AM. 03
 (d) Consider an engineering part with five different build directions and explain their effect on the support volume. 07

OR

What are the factors that determine the effectiveness of hollowing inside techniques? Consider an engineering part and identify pros and cons of different infills patterns for that objects. 07

- Q.4 (a) What are the new materials developed for AM process? 02
 (b) Write some AM applications as Civil engineer. 02

- (c) Explain Re-manufacturing and its process. 03
- (d) Why AM application is popular for Aerospace, and Automobile Engineering? Explain. 07

OR

Describe briefly the application of AM in Medical. 07

- Q.5 (a) What are post processing activities in AM process? 02
- (b) How aesthetic improvement can be done in AM products? 02
- (c) Explain Thermal and Non-thermal techniques for property enhancements of AM products. 03
- (d) Distinguish cleaning, postcuring, and finishing which are the various task of post processing. Name two RP process that do not require postcuring and one that does not require cleaning. 07

OR

Elaborate the opportunities of digiproneurship as a employment generation by Additive Manufacturing. 07

ME-1881/1781(B)
B.Tech. -VIII Sem: Mechanical Engineering
Unconventional Machining Process

Time: 3 Hrs.

Max. Marks: 70

Min. Marks: 22

Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

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Part c – Max 100 words and Part d – Max 400 words.

Word limit NOT to be followed for diagram, numerical, derivation.

- Q. 1** (a) What are the characteristics of unconventional machining process? **02**
 (b) What are the factors that affect the material removal rate in Abrasive Jet Machining? **02**
 (c) What are the applications of Water jet machining process? **03**
 (d) Explain the principle of AJM. Mention some of the specific applications. **07**
- OR**
- Explain the USM machine setup and discuss various feed mechanisms. **07**
- Q. 2** (a) What are essential characteristics of an electrolyte used in ECM process? **02**
 (b) What are the disadvantages of Electro Chemical Machining process? **02**
 (c) What is the difference between ECG and conventional grinding? **03**
 (d) Discuss about the electrochemical honing and electrochemical grinding. **07**
- OR**
- Explain the principles, equipment's, process capabilities, accuracy and surface finish of Electro Chemical Grinding. **07**
- Q. 3** (a) What is overcutting in EDM process and how is it affected by ampere and frequency? **02**
 (b) Write any two applications of PAM? **02**
 (c) State the working principle of EBM? **03**
 (d) Draw the schematic set-up of Plasma Arc Machine. Indicate various parts. **07**
- OR**
- Explain the process of electrical discharge machining, its process parameters and applications. **07**
- Q. 4** (a) State the working principle of Laser beam machining? **02**
 (b) What are the applications of LBM? **02**
 (c) Give the examples of solid-state laser? **03**
 (d) Discuss in detail about the thermal features and analysis of laser beam machining. **07**
- OR**
- Write short note on:- (1) Laser micromachining **07**
 (2) laser engineered net shaping
- Q. 5** (a) What are the most common metal 3D printed applications? **02**

- (b) What is Laminated object Manufacturing? **02**
- (c) What is Fused Deposition Modelling (FDM)? **03**
- (d) Explain Selective Laser Sintering Process. What is the advantage of this process over conventional sintering process? **07**

OR

What is micro/nano fabrication technique? Explain in brief thin film deposition and physical vapor deposition techniques. **07**

ME-1782(A)
Examination – May-June - 2022
B.Tech. VIII Sem: Mechanical Engineering
Power Plant Engineering

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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Word limit NOT to be followed for diagram, numerical, derivation.

- Q.1 (a) What are primary and secondary energy sources? 02
- (b) What is direct energy conversion system? 02
- (c) What is biomass? How energy can be generated using biomass? 03
- (d) Explain various methods of converting solar energy into electric energy with neat diagram? 07

OR

Explain the working principle of vertical axis wind mill with a neat sketch? 07

- Q.2 (a) Explain the working of economizer used in thermal power plant to increase thermal efficiency? 02
- (b) Explain the working of Super heaters used in thermal power plant to increase thermal efficiency 02
- (c) What is the use of conveyors in thermal power plants? What are different types of coal conveyors? 03
- (d) Discuss the need of feed water treatment in the thermal power plant? Discuss few methods used for this? 07

OR

Explain the factors to be considered for selecting a site for a coal based thermal power plant? 07

- Q.3 (a) What are moderators in nuclear power plant? 02
- (b) Explain the role of fission and fusion reactions in nuclear reactors? 02
- (c) What are different components of nuclear power plant? What are different fuels used in nuclear power plant? 03
- (d) Discuss working of different types of nuclear reactor with neat sketch? 07

OR

Describe cladding in nuclear reactors. Describe the properties of three cladding materials? 07

- Q.4 (a) How dams are classified? 02
(b) What are different types of spillways used in practice? 02
(c) Why draft tube used in reaction turbine? 03
(d) Give criteria for site selection and discuss salient feature of a hydropower station? 07

OR

Following data are collected for a hydroplant site 07

Available Head : 250 meter

Total Catchment area : 60 Sq. KM

Annual Rainfall : 1600mm

Run-off : 70 percent

- (1) What type of turbine will be selected for the plant?
(2) Calculate suitable capacity of a turbo-generator if turbine efficiency is 80%, generator efficiency 92% and penstock efficiency is 75%. Assume load factor as 70%

- Q.5 (a) Explain Connected load & Maximum demand? 02
(b) Explain Demand factor and Load Factor? 02
(c) What are the advantages of interconnected system? 03
(d) What do you understand by term tariff? What are different types of tariffs? Explain in brief? 07

OR

For a power station the yearly load duration curve is a straight line from 30,000KW to 4,000KW. To meet the load three turbo-generators are installed. The capacity of two generators is 15,000KW each and third is rated at 5,000KW. Determine the following: 07

- (1) Load Factor (2) Capacity Factor (3) Max. Demand

ME-1882
Examination –May-June.- 2022
B.Tech. VIII Sem : Mechanical Engineering
Product Design & Development

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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- Q.1 (a) List the essential factors of product design. 02
 (b) What is the difference between innovation & evolution? 02
 (c) Define the terms: allowances, Process Capability and Tolerances? 03
 (d) What are the seven phases of the morphology of design process? What is the difference between Primary phases and Secondary phases? 07

OR

What is modelling and simulation? How is a scale model tested? 07

- Q.2 (a) List the various product design strategies. 02
 (b) What is meant by 'simplification' in design? Explain with an example. 02
 (c) Explain various relationships between design, production and marketing through a flow chart. 03
 (d) Explain the following strategies used by product designers in 'functional design practice' 07
 (i) Biasing, (ii) Cascading, (iii) Regeneration, (iv) Avoidance of redundancy,
 (v) Compability. Give suitable examples.

OR

Explain the following terms: 07

- (i) functional design, (ii) Production design, (iii) Design for transportation,
 (iv) Maintainability based design, (v) Ergonomic design

- Q.3 (a) Define value and value analysis? 02
 (b) What is creativity? How does design by creative routes differ from engineering design? 02
 (c) What is the approach to reliability based design? What is the relationship between reliability and factor of safety? Derive a formula linking reliability and factor of safety. 03
 (d) What is a profit-volume chart? Sketch a profit volume chart showing profit (P), break-even quantity Q, fixed cost (F), slope (b-a) of the (P/v) line. 07

OR

What are the merits of following strategies in affecting production costs? Discuss. 07
(a) Modular design, (b) group technology, (c) automation, (d) assembly line,
(e) compact design, (f) specification and tolerances, (g) foldable and stackable design
and (h) use of available stock.

- Q.4 (a) What is a launch cycle? What are the four phases of launch cycle? 02
(b) What is the difference between idea and concept? Illustrate with an example. 02
(c) What are the different strategies available to a firm during the four stages of a product life cycle? 03
(d) Explain the new product development process according to Booz, Allen and Hamilton in your own words. 07

OR

How is a product defined by concentric circles? Explain: (i) core benefit, (ii) generic product, (iii) expected product, (iv) augmented product, (v) potential product. 07

- Q.5 (a) What is the concept of design for environment? 02
(b) List the techniques to reduce environmental impact. 02
(c) What is the benefit of increasing life cycle time for a product in DFE? 03
(d) What is meant by life cycle assessment? Explain with a block diagram the components of life cycle assessment of product. 07

OR

Explain Gradel and Allenby's Environmentally Responsible Product Assessment matrix. Calculate, using the 5×5 matrix the Green Score Index for a kitchen mixer. 07
