

Galgotias University

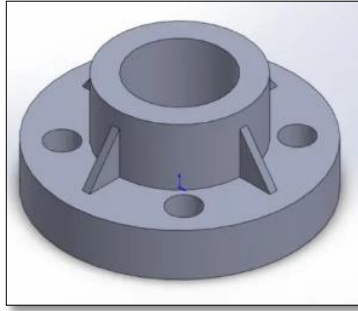
Department of Mechanical Engineering

G3UB101B: - Engineering Design and Prototyping

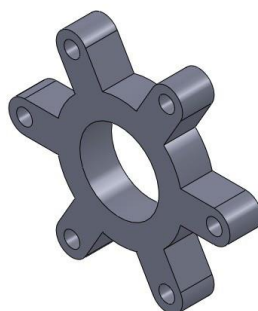
Practice Questions

- Q.1.** Assess the key benefits of using rapid prototyping in product development.
- Q.2.** Define CAD and explain various design-related tasks performed by CAD.
- Q.3.** Summarize the practical applications of surface development in product design.
- Q.4.** Summarize the procedures for applying materials and appearances to 3D models in SolidWorks for realistic rendering.
- Q.5.** Discuss the purpose of converting a solid model file into an STL file and list at least four software options for slicing in 3D printing.
- Q.6.** Discuss the significance of dimensioning in any drawing.
- Q.7.** Define additive manufacturing and classify additive manufacturing processes in detail.
- Q.8.** Define "boss extrude" and differentiate it from "cut extrude," with examples.
- Q.9.** Explain the differences between a fully defined sketch and an underdefined sketch in SolidWorks.
- Q.10.** Discuss the impact of 3D printers on education and research in academic institutions, considering learning, experimentation, and scientific discovery.
- Q.11.** Differentiate between first angle projection and third angle projection.
- Q.12.** Explain the role of assemblies in 3D modeling using SolidWorks.
- Q.13.** Describe the different tools available in the feature option of SolidWorks, providing examples.
- Q.14.** Identify the standard SI unit of measurement used in Engineering Drawing.
- Q.15.** Compare design by evolution and design by innovation, providing examples.
- Q.16.** Discuss the importance of surface development in product design, accompanied by a clear diagram.
- Q.17.** Describe Stereolithography (SLA) technology in 3D Printing.
- Q.18.** Discuss the steps involved in 3D printing with a flow diagram and list sectors where 3D printing is applicable.
- Q.19.** Define parametric modeling and enumerate three software platforms that operate based on parametric modeling principles.

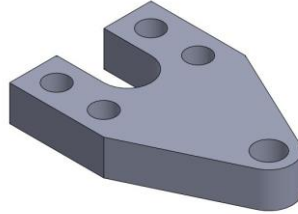
- Q.20.** Examine the role of engineering graphics in product design, accompanied by a clear diagram.
- Q.21.** Discuss the materials used in 3D printing and the criteria for selecting materials.
- Q.22.** Discuss the advantages of computer-assisted drawing over manual drawing.
- Q.23.** Discuss the impact of 3D printer software on the 3D printing process, from designing a 3D model to preparing it for printing, including CAD software, slicing software, and firmware, and their specific roles in the workflow.
- Q.24.** Discuss which projection method, orthogonal or oblique, would be preferable for technical drawing of a complex 3D object, providing rationale based on advantages and limitations.
- Q.25.** Enumerate at least five drawing standards commonly utilized in engineering drawing.
- Q.26.** Explain how multi-view drawings serve as crucial tools in product design.
- Q.27.** Discuss the limitations of 3D printing and suggest methods to overcome them.
- Q.28.** Explain the function of the center line in a 2D sketch within SolidWorks.
- Q.29.** Define digital fabrication.
- Q.30.** Assess the key advantages of additive manufacturing over traditional manufacturing techniques.
- Q.31.** Discuss the steps involved in slicing an STL file of a 3D model and why this conversion is necessary for 3D printing.
- Q.32.** Discuss the importance of resolution in STL file generation, comparing coarse and fine resolution.
- Q.33.** Discuss the role of engineering graphics in product design with a neat diagram.
- Q.34.** Analyze the parametric features in SolidWorks and discuss their importance in 3D modeling.
- Q.35.** Describe the process of reverse engineering using 3D scanning, including steps involved and its application in product design and manufacturing.
- Q.36.** Outline the function of the "Sketch" tool within SolidWorks.
- Q.37.** Examine the use of the "Design Table" feature in SolidWorks.
- Q.38.** Elaborate on reverse engineering and its application in CAD.
- Q.39.** Organize the design procedure of 3D models for FDM printing with a clear representation.
- Q.40.** Discuss the impact of 3D printers on education and research in academic institutions, considering learning, experimentation, and scientific discovery.
- Q.41.** Describe the different series of steps involved in making of following 3D sketch. Also explain the different commands used under Solidworks for the 3D sketch:



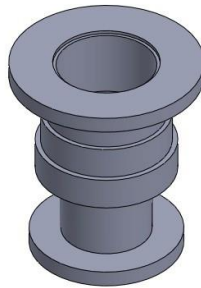
- Q.42.** Differentiate between drawing and engineering drawing.
- Q.43.** Describe the process of reverse engineering using 3D scanning, including steps involved and its application in product design and manufacturing.
- Q.44.** Explain constructive geometry and detail different boolean operations used in constructive geometry for solid modeling.
- Q.45.** Elaborate on part editing tools in SolidWorks and how they facilitate effective creation and modification of 3D models.
- Q.46.** Discuss the key benefits of using rapid prototyping in the design and development process.
- Q.47.** Explain the role of engineering graphics in product design with a neat diagram.
- Q.48.** Summarize the components and functions of an FDM 3D printer.
- Q.49.** Define orthographic projection and delineate the necessary components for projection with a sketch.
- Q.50.** Elaborate on the impact of 3D printer software on the 3D printing process, from designing a 3D model to preparing it for printing, including CAD software, slicing software, and firmware, and their specific roles in the workflow.
- Q.51.** How can you create a 2D sketch with symmetry in SolidWorks? Provide an example.
- Q.52.** Summarize the essential tools and technologies required in a digital fabrication laboratory, along with their applications.
- Q.53.** Assess the key benefits of using rapid prototyping in product development.
- Q.54.** Describe the product development cycle with a clear sketch.
- Q.55.** Describe the different series of steps involved in making of following 3D sketch. Also explain the different commands used under Solidworks for the 3D sketch:



Q.56. Describe the different series of steps involved in making of following 3D sketch. Also explain the different commands used under Solidworks for the 3D sketch:



Q.57. Describe the different series of steps involved in making of following 3D sketch. Also explain the different commands used under Solidworks for the 3D sketch:



Q.58. Explain the term orthographic projection. Why second angle and fourth angle projections are not used?

Q.59. Explain the term CAD in engineering graphics. Identify the limitations of manual drawing.

Q.60. Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart.

- i. A is in the H.P. and 20 mm behind the V.P.
- ii. B is 40 mm above the H.P. and 25 mm in front of the V.P.
- iii. C is in the V.P. and 40 mm above the H.P.
- iv. D is 25 mm below the H.P. and 25 mm behind the V.P.

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