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Question Paper Code : 81151

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Second Semester

CAD/CAM

CC 9221/CC 921/ED 972/UED 9172/10222 EDE 61 — DESIGN OF
MANUFACTURE, ASSEMBLY AND ENVIRONMENTS

(Common to M.E. – Computer Aided Design/M.E. – Engineering Design and
M.E. – Product Design and Development)

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List any three design guidelines by considering the static strength, axial loading and torsion for design of a typical Engineering component.
2. For the component shown in Fig.1, Specify the Primary and secondary datum. Also indicate the constrained DOF in each datum.



Fig. 1

3. Specify the influence of materials on form design of forged components.
4. Which one of the following weld design shown in Fig.2, is preferred and why?

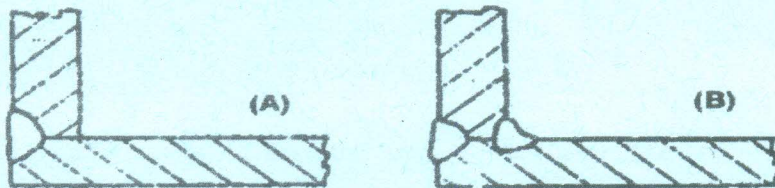


Fig. 2

5. Given the following incorrect design (Fig. 3), specify the improved design which facilitates manufacturing.

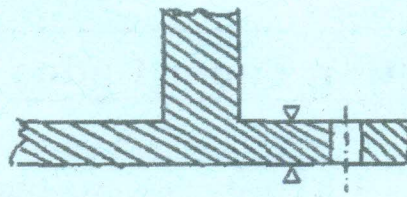


Fig. 3

6. Illustrate the principle of amalgamation with an example.
7. Specify the application of software in DFMA.
8. List the factors to be considered in the process of identifying uneconomical design.
9. Specify the design guide lines of design for environment.
10. What is design for energy efficiency?

PART B — (5 × 16 = 80 marks)

11. (a) A gear box housing is to be manufactured for an automotive application, specify and explain the factors to be considered with respect to strength, materials, mechanical factors and type of manufacturing method to be adopted. (16)

Or

- (b) (i) Define process capability index. Specify any two methods to improve C_p , value of a process, when it is less than one. Also sketch the conditions for $C_p = 1$, $C_p < 1$ and $C_p > 1$. (6)
- (ii) What are the advantages of geometric tolerances? Specify any four geometric tolerances with symbols. (4)
- (iii) Calculate the unknown dimension for the component shown in Fig.4, based on worst case method. (6)

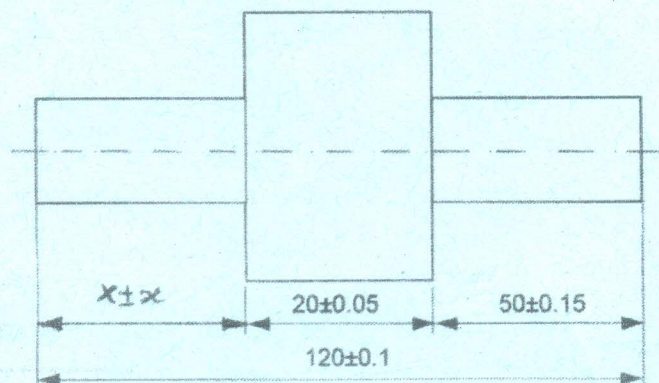


Fig. 4

12. (a) Explain the influence of materials on form design of welded structures with an example. (16)

Or

- (b) Two different casting designs of a bracket are shown in Fig. 5, among two, identify the preferred design. Explain the preferred form design from design and manufacturing perspective. (16)

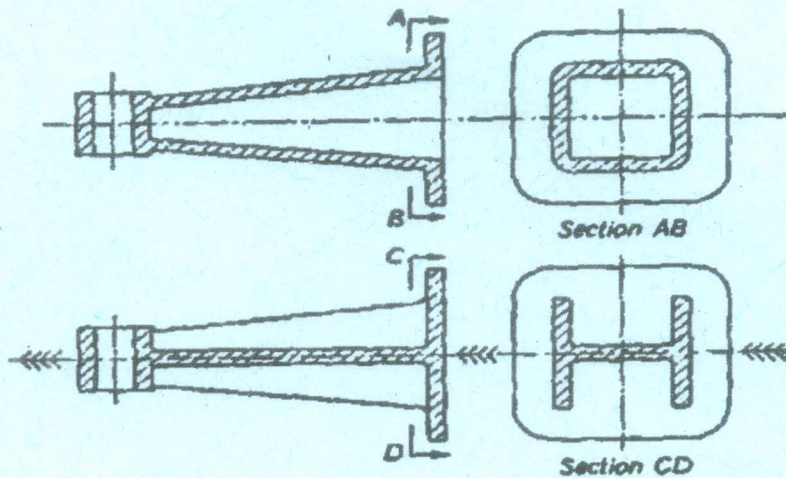


Fig. 5

13. (a) Write short notes on the following with suitable example :
- (i) Dowelling procedures (8)
 - (ii) Design features which facilitate the manufacture of key ways. (8)

Or

- (b) Explain the following with an example :
- (i) Simplification by separation (8)
 - (ii) Design for clampability. (8)

14. (a) Explain the following with respect to sand casting with suitable examples.
- (i) Preferred parting line which minimizes or eliminates core requirements (8)
 - (ii) Design modifications in the castings to eliminate core requirements and modify the design to minimize the core requirements. (8)

Or

- (b) Explain the key characteristics of group technology with an illustrative example. (16)

15. (a) Explain the different stages of a product life cycle. Explain product life cycle analysis with a case study. (16)

Or

- (b) Explain the following with suitable example.
- (i) Design for recycling (8)
 - (ii) Design for remanufacturing. (8)
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