CBCS SCHEME

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15ME744

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Design for Manufacturing

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Discuss the major phases of design and its relevance to design for manufacture. **(08 Marks)**

b. What are guidelines to be followed in design for manufacturing and assembly? Explain. **(08 Marks)**

OR

2 a. Briefly explain how tolerance grades can be achieved in milling and turning. **(08 Marks)**

b. How do you select material in case of gear box and justify effect of material properties on design? **(08 Marks)**

Module-2

3 a. Explain the concept of virtual size, substantiate your answer with a neat sketch. **(08 Marks)**

b. The carrier wheel assembly shown in Fig.Q3(b) has a specific assembly requirement. The axial freedom of movement of gear wheel with bush on stud has maximum of 0.3 mm and minimum play of 0.12 mm. Allocate appropriate limits for the relevant components. Nominal length of bush is 30 mm and the nominal length of central portion of stud is 30 mm.

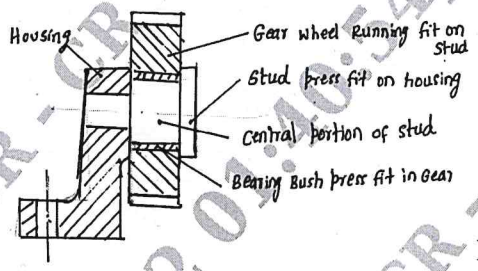

Fig.Q3(b) **(08 Marks)**

OR

4 a. What is laminated shim and explain under what circumstances it is used. **(08 Marks)**

b. A manufacturing company is having limited resources. The process capability of machines does not meet the assembly requirements specified by the designer. How to meet the requirement under this situation? **(08 Marks)**

Module-3

5 a. Define functional and manufacturing datum. Explain the procedure of changing datum. **(08 Marks)**

b. Identify functional and non functional dimensions for the component shown in Fig.Q5(b). Incorporate geometric tolerances for the part and complete the drawing.

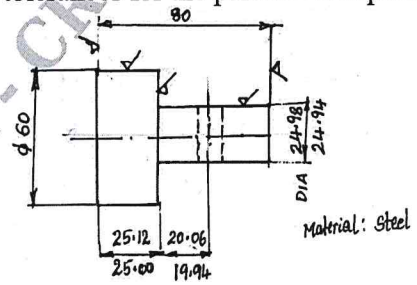

Fig.Q5(b) **(08 Marks)**

OR

6 a. Explain with suitable example simplification by separation and simplification by amalgamation. **(08 Marks)**

b. For the part shown in Fig.Q6(b) re-dimension the part to suit for manufacturing. Explain the machining sequence to produce the part.

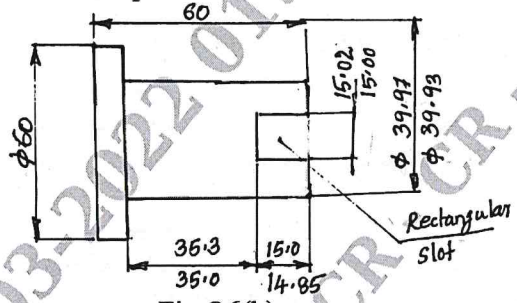

Fig.Q6(b) **(08 Marks)**

Module-4

7 a. Explain with neat sketch any four casting design consideration. Justify your answer with suitable example. **(08 Marks)**

b. A foundry company engaged in production of flanged bush made out of cast iron as shown in Fig.Q7(b) in small quantities. Suggest the possible alternatives of mould for casting.

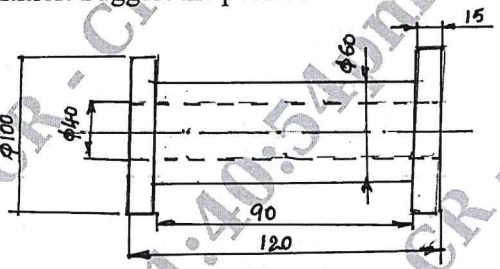

Fig.Q7(b) **(08 Marks)**

OR

8 a. Discuss the guidelines to be followed for spot welding. Explain any four. **(08 Marks)**

b. What are the key knowledge area a designer of weldment should possess? Explain any eight areas. **(08 Marks)**

Module-5

9 a. Discuss various manufacturing considerations for design of forged parts. **(08 Marks)**

b. Parts are manufactured by injection molding, discuss the design considerations required for part production. **(08 Marks)**

OR

10 a. List the reasons for converting failure part due to casting to forged part for functional performance. **(08 Marks)**

b. From DFM perspective, explain the important guidelines to be followed to produce parts by powder metallurgy technique. **(08 Marks)**

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