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12. (a) A B-Spline curve is defined by the points $P_1[1, 1]$, $P_2[5, 5]$, $P_3[8, 5]$, $P_4[4, 3]$
- (i) Plot the curve (10)
 - (ii) Find the tangent to the curve at $u = 0.25$. (1.5)
 - (iii) Find the normal to the curve at $u = 0.25$. (1.5)

Or

- (b) Discuss in detail about the basic elements and building operators of B-Rep scheme required for building the following solid model Fig. 1.

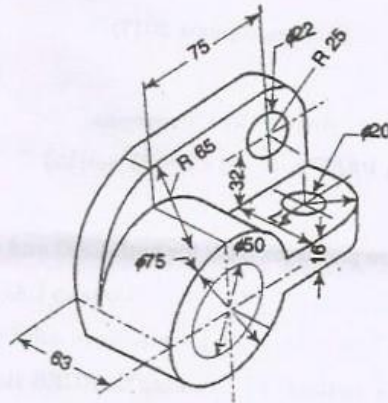


Fig. 1

13. (a) How would you transfer the data between dissimilated CAD/CAM system? Discuss the same.

Or

- (b) Describe briefly the architecture of the following data exchange formats :
- (i) STEP (7)
 - (ii) PDES (6)

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14. (a) For the following component shown in Figure 2. Make a part program for the vertical machining centre. Clearly show the set point and axes on the sketch of the part. Assume the size of the blank is $162 \times 92 \times 10$. All dimensions are in mm.

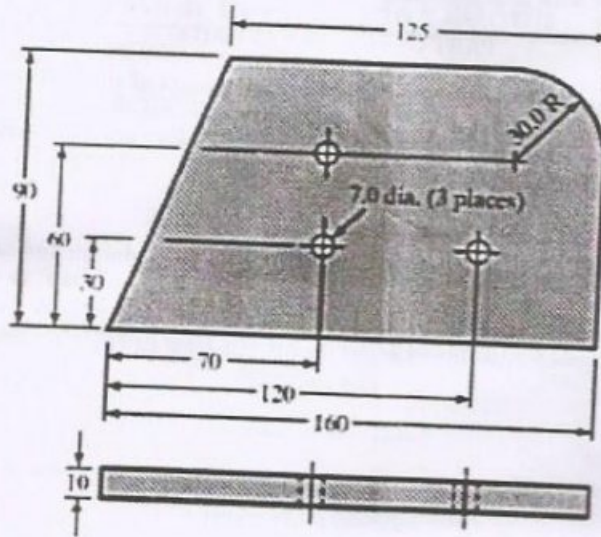


Fig. 2

Or

- (b) Write a CNC program for machining the component shown in Figure 3. Assume that the workpiece is having size of $\phi 108 \text{ mm} \times 60 \text{ mm}$.

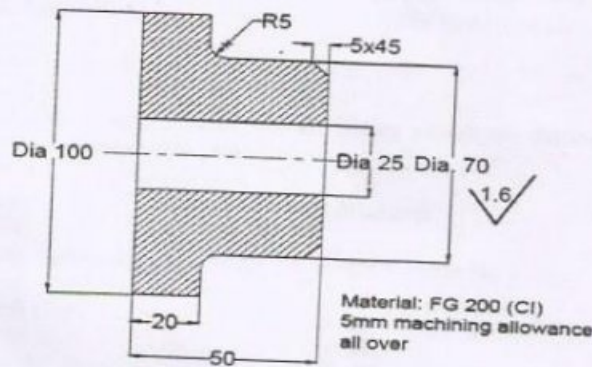
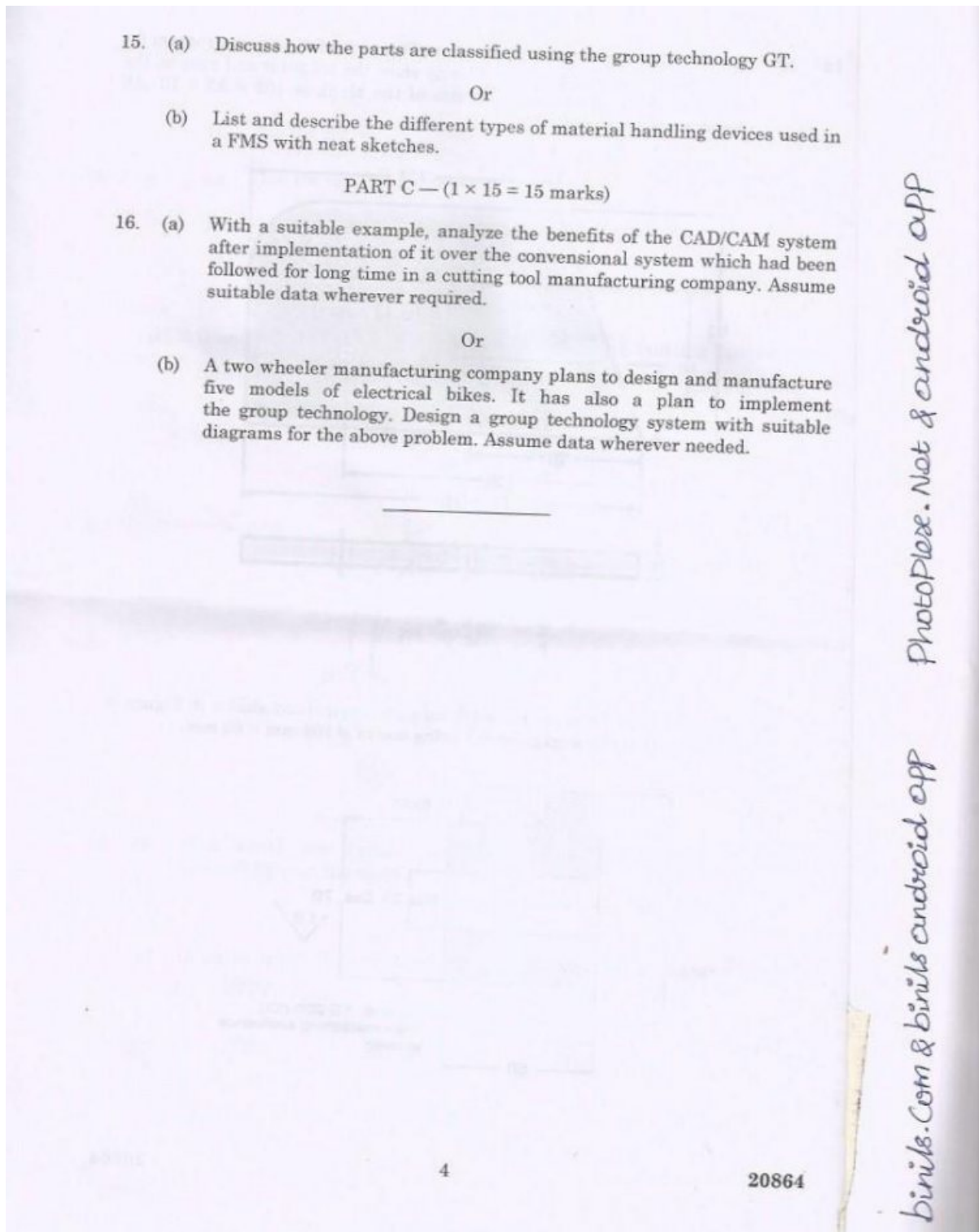


Fig. 3



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