Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –II Examination Dec. - 2011

Subject code: 1720902 **Date: 12/12/2011**
Subject Name: Geometrical Dimensioning and Tolerancing
Time: 02.30 pm – 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Convert the drawing given in figure 1 from plus and minus to true position tolerancing. Also dimension the mating part containing the bore using the datums, base dimensions and position tolerance so it is compatible with the first part. **07**
Also specify the advantages of true position tolerancing over plus and minus tolerances.

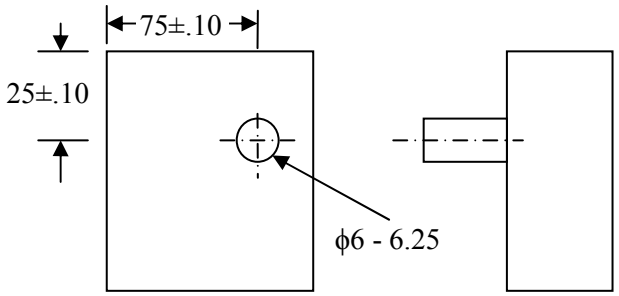

Fig 1

(b) With the help of a suitable example, bring out the meaning and significance of various parts of a feature control frame. Also specify the purposes served by various modifiers when added to the feature control frame. **07**

Q.2 **(a)** With the help of suitable examples show the concept of primary, secondary and tertiary datums and bring out its relevance to both manufacturing of components and their subsequent inspection **07**

(b) **07**

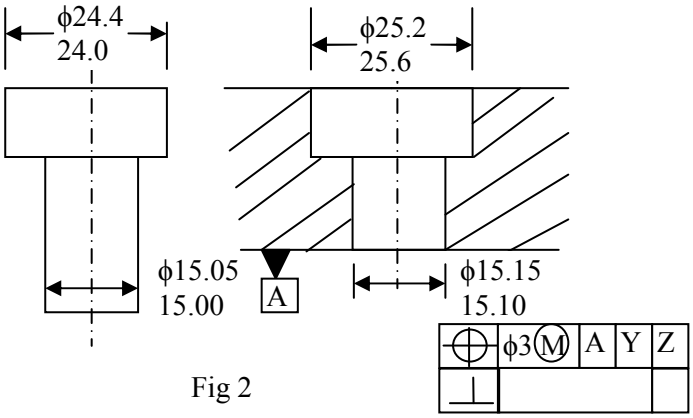

Fig 2

Assign appropriate coaxiality controls to assure these two parts will mate at assembly (figure 2). Also fill in the perpendicularity control

OR

(b) Complete chart sections A, B & C using the illustration shown in figure 3. (a) What is the diameter of the allowed deviation from true position? (b) **07**

What is the diameter of the deviation zone formed by the actual deviation from true position? (c) Is the part good?

Dimension from datum C	Dimension from datum B	Actual hole size	Answers		
			A	B	C
1.901	.924	.500			
1.905	.929	.505			
1.902	.926	.510			
1.925	.932	.502			

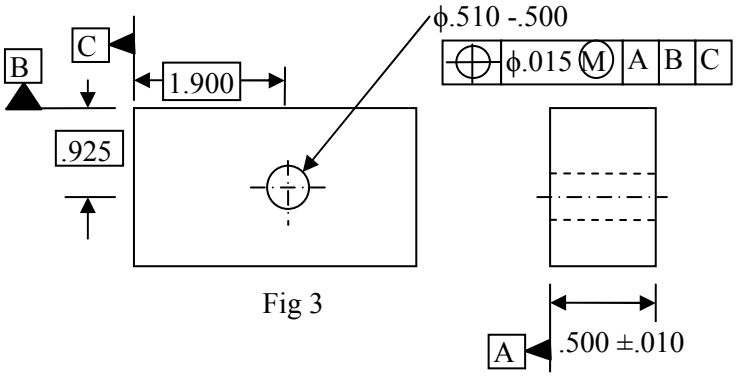

Fig 3

Q.3 (a) **07**

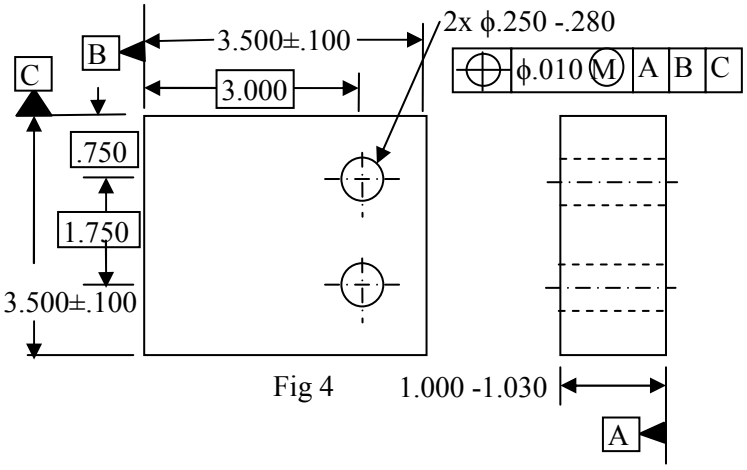

Fig 4

What is the minimum wall thickness of the most endangered hole?

(b) Name various run outs and explain them, giving suitable examples. Why material condition symbols are not used with run outs? **07**

Do you need to specify datum(s) with run outs? Justify your answer giving suitable examples.

OR

Q.3 (a) With the help of neat sketches bring out the situations requiring datum targets. How will you physically attain point, line and surface datum target contacts - give neat sketches. **07**

(b) Is circularity a 2-dimensional or 3-dimensional control? What is the shape of the tolerance zone and how is it checked? (Give neat sketches). What material conditions are allowed? Are datums allowable? **07**

Q.4 (a) With the help of suitable examples explain virtual and resultant condition boundaries, when (i) MMC is applied to the feature (ii) LMC is applied to the feature (iii) RFS is applied to the feature **07**

(b) Differentiate between circularity and cylindricity. Sketch the shape of the tolerance zone. Can cylindricity and circularity be applied to the same surface? If so, which tolerance must be smaller and why? If not, why not? **07**

OR

Q.4 (a) Explain, with the help of suitable example, how will you use virtual and **07**

resultant condition boundaries to calculate the minimum wall thickness of a feature with an MMC modifier

(b) **07**

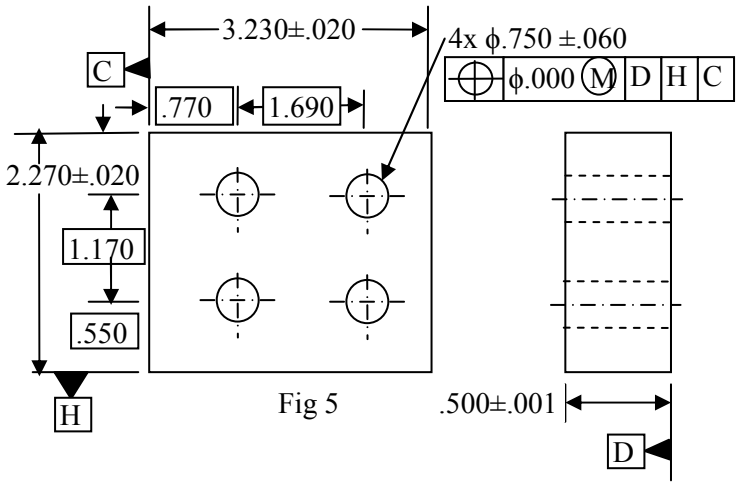

Fig 5

If any of the four hole is made at MMC, what size is the positional tolerance zone? Where is the positional tolerance drawn from? How much positional tolerance is potentially available to each hole? What are the size limits of the holes? What is the virtual condition of each hole? What would be the size and shape of the positional tolerance zone if a hole is produced at .750 diameter? Design a functional gauge to check the position of the holes.

Q.5 **(a)** Explain the role played by various form control characteristics giving suitable examples **07**

(b) Explain the role played the control characteristics namely concentricity, symmetry and positional, giving suitable examples **07**

OR

Q.5 **(a)** Explain the role played by various orientation control characteristics, citing suitable examples **07**

(b) With the help of suitable examples explain how profile of a line and profile of a surface can be controlled. Can profile control be used to check co-planarity? If, yes, explain giving suitable example. **07**

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