Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720902 **Date: 09/07/2012**

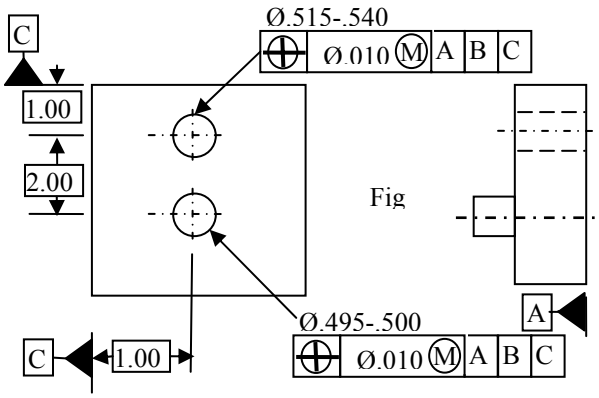
Subject Name: Geometrical Dimensioning and Tolerancing

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

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

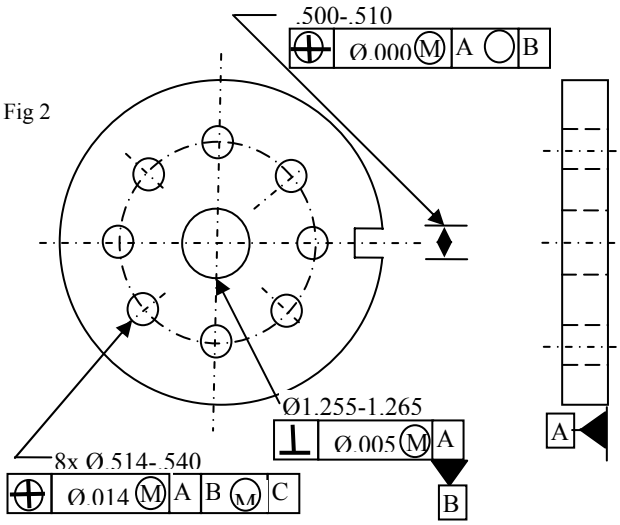
Q.1 (a) **07**



Specify the MMC & LMC for both the hole and the pin. What datum(s) control(s) perpendicularity? What datum(s) control(s) location? Complete the table below:

Actual feature size (Hole)	Total positional tolerance	Actual feature size (pin)	Total positional tolerance
0.515		0.498	
0.525		0.496	

(b) When inspecting the eight-hole pattern of fig 2: (a) Does the centre hole, datum B, apply at MMC or virtual condition? If the centre hole were produced at Ø1.260, how much shift tolerance would be available from the centre hole? (b)Does the key seat, datum C, apply at MMC or virtual condition? If the key seat were produced at 0.505, how much shift tolerance would be available from the key seat? Also calculate the minimum wall thickness **07**



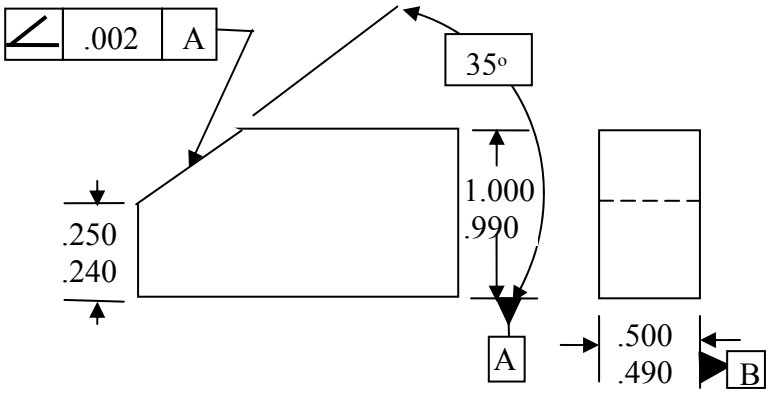
Q.2 (a) With the help of suitable examples explain(i) compound datum for co-planarity and co-axiality (ii) two co-axial diameters to construct a datum axis (iii) Datum target area **07**

(b) For the hole and pin given in fig 1, specify the inner locus, outer locus, virtual condition and resultant condition. If the modifier is changed to LMC, calculate the values of inner, outer loci & virtual and resultant conditions **07**

OR

(b) In the context of fig1, explain how virtual & resultant conditions are significant for functioning of the component as part of an assembly **07**

Q.3 (a) **07**



What is the shape and size of the tolearance zonedefined by the geometric control? If we wanted that tolerance zone be perfectly perpendicular to datum plane B as well as exactly 35° from datum plane A, what could we do to the given feature control frame to reflect that? How does the tolerance zone shape for angularity in this control differ from the tolerance zone tht would be generated if the 35° was ±2°?

(b) With the help of suitable example, bring out the advantage of zero positional tolerance compared to plus or minus positional tolerance **07**

OR

Q.3 (a) **07**

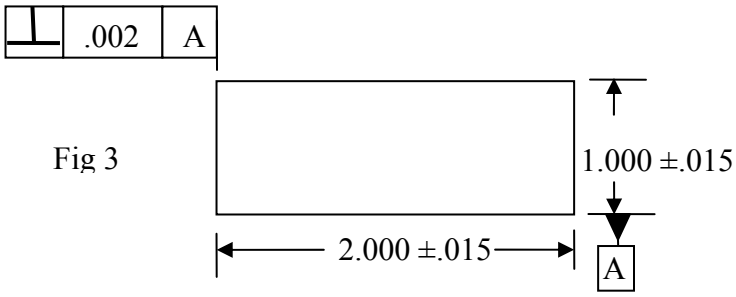


Fig 3

Sketch and label the shape and size of the tolearance zone formed by the perpendicularity control. Is the tolerance of perpendicularity additive to the part MMC or must it be contained within the part MMC? Justify your answer. In this control the perpendicularity tolerance of .005 is smaller than the part size tolerance of ±.015. Could the perpendicularity tolerance have been equal to or larger than the part size tolerance? Why or why not?

Without the feature control frame what would be the maximum permissible perpendicularity error.

(b) With the help of suitable example, bring out the advantage of zero positional tolerance compared to a specified positional tolerance **07**

Q.4 (a) With the help of a suitable example explain what you mean by datum feature of size. How does it influence the feature under consideration, when used as secondary datum? **07**

(b) **07**

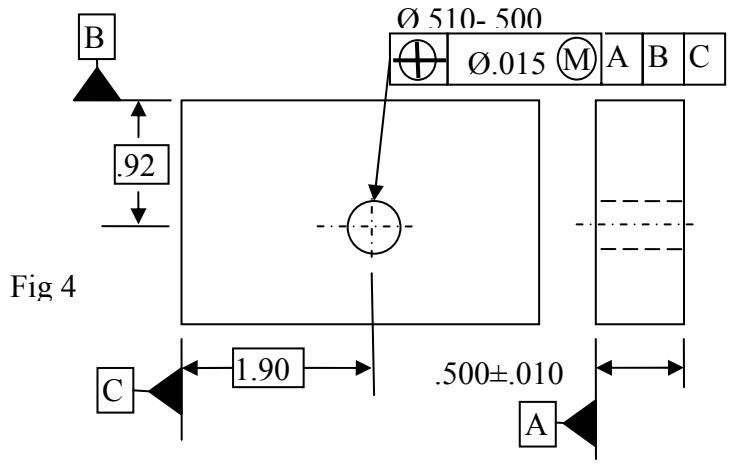


Fig 4

Complete chart sections A, B and C using fig 4.
a) What is the diameter of the allowed deviation from true position? (b) What is the diameter of the deviation zone formed by the actual deviation from true position? (c) Is the part good?

Dim from Datum C	Dim from Datum B	Actual Hole Size	Answers		
			A	B	C
1.901	.924	.500			
1.905	.929	.505			
1.900	.910	.509			

OR

Q.4 **(a)** With the help of neat sketches, differentiate between circular and total runout. If circular runout and total runout are used on the same feature, which control must have the smaller runout tolerance? **07**

Q.4 **(b)** Explain any TWO of the form controls-give examples **07**

Q.5 **(a)** Explain the procedure to be followed in paper gauging **07**

(b) **07**

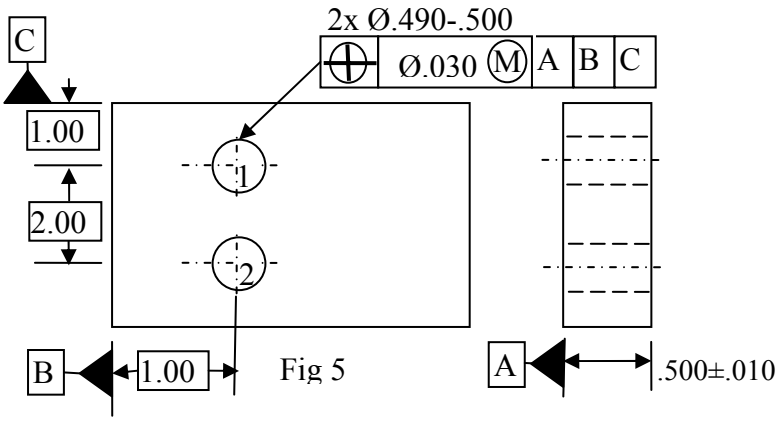


Fig 5

Hole actual size #1 = .500
#2 =.498
Hole position: Axis#1 = 1.002 from datum C
= 1.004 from datum B
#2 = 2.997 from datum C
= .998 from datum B

Using the concept of paper gauging check whether the features are acceptable or not

OR

Q.5 **(a)** Explain with neat sketches the concept of projected tolerance zone & floating fasteners **07**

(b) Explain functional gauge design taking suitable example **07**

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