Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code: 720902

Subject Name: Geometrical Dimensioning and Tolerancing

Date: 06 /07 /2010 **Time: 11.00am – 1.30pm**

Total Marks: 60

Instructions:

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

Q.1 (a) With the help of a suitable example explain the meaning and significance of virtual condition. Convert this drawing (Fig 1) from square tolerance zone to circular tolerance zone with true position tolerancing. The mating shaft has a size tolerance of ϕ5.6 - ϕ5.8. **06**

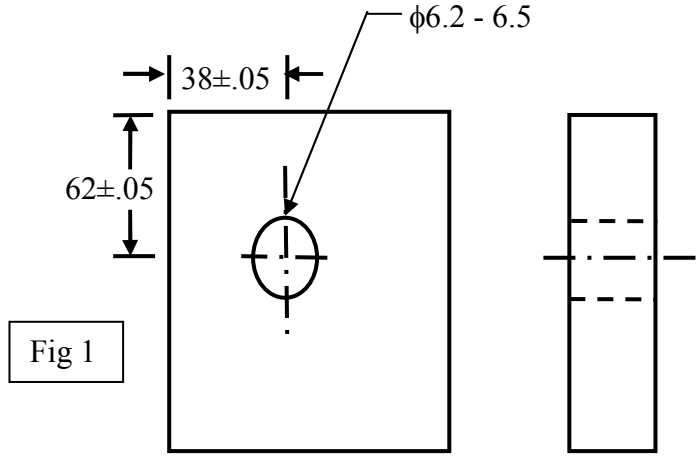

Fig 1

(b) Using the drawing given below (Fig 2), complete the following charts **06**

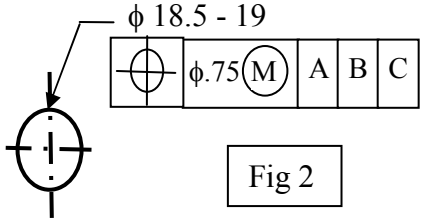

Fig 2

IF A HOLE				IF A SHAFT		
Actual size	Bonus Tolerance	Total Tolerance		Actual size	Bonus Tolerance	Total Tolerance
19.00				19.00		
18.70				18.70		

If LMC is used instead of MMC will I affect the bonus tolerance? If yes, how much in each case mentioned above.

Q.2 (a) What is the size and shape of the positional tolerance zone for each hole when the hole is produced at ϕ12.5 and ϕ12.8 (Fig 3)? If bonus tolerance is to be used, how will you modify the feature control frame? If the flatness error of datum A is .05, then will it influence the positional error? Justify your answer. **06**

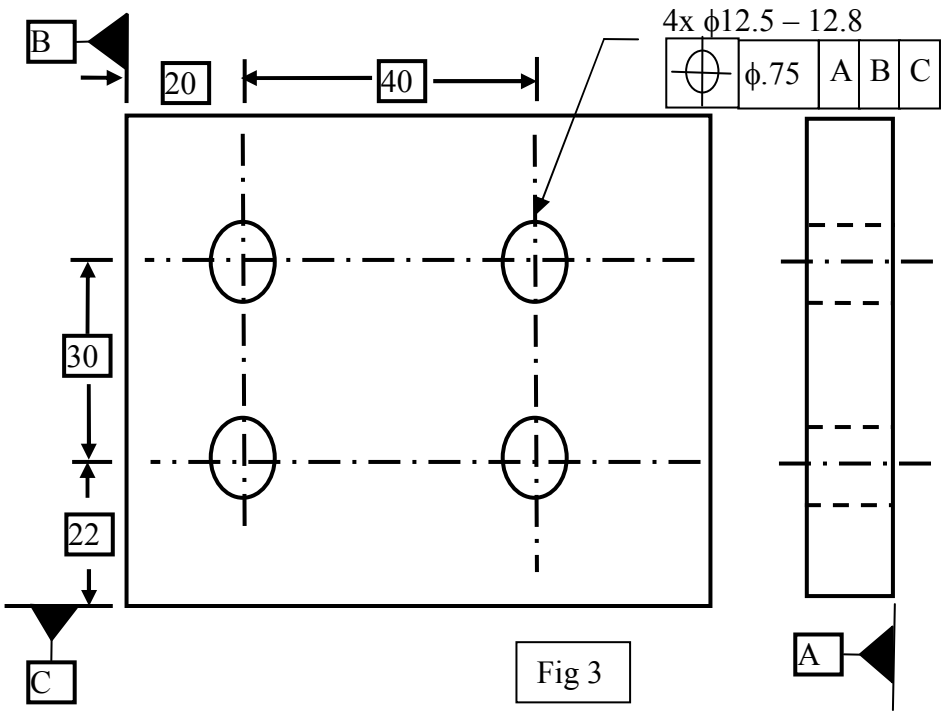

Fig 3

(b) With the help of suitable example explain various Orientation controls **06**

OR

(b) With the help of suitable example explain various Form controls **06**

Q.3 **(a)** Calculate the tolerance of the mating part for the illustration given in Fig 4 **06**

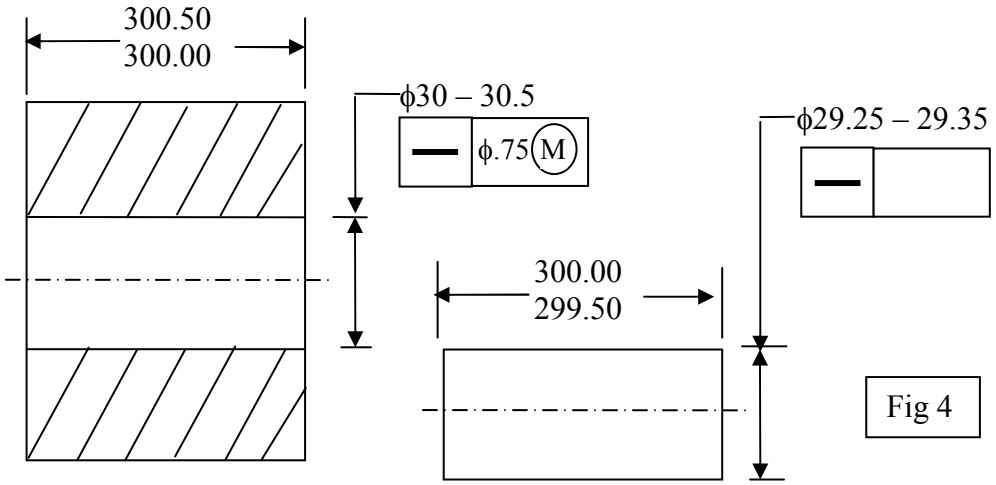

Fig 4

(b) For the illustration given in Fig 5, calculate the minimum wall thickness **06**

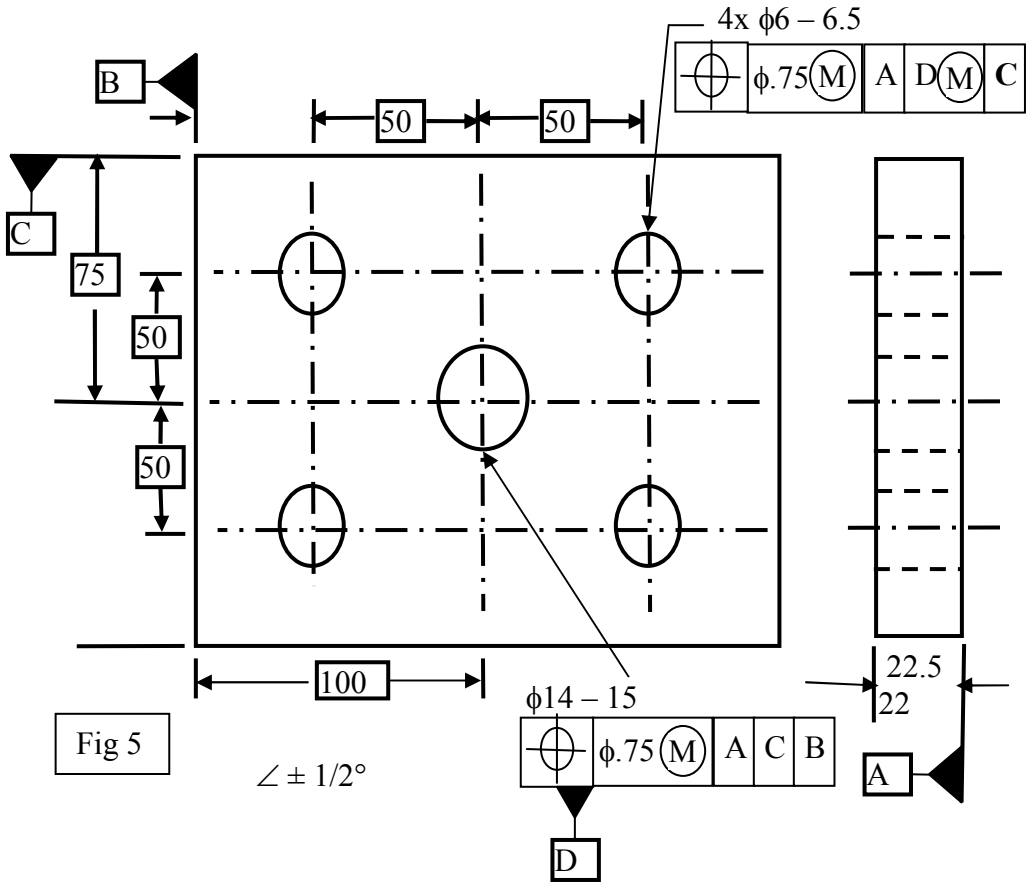

Fig 5

OR

Q.3 **(a)** Explain the following terms with the help of suitable illustrations. (i) co planarity (ii) radial run out (iii) Total run out **06**

(b) **06**

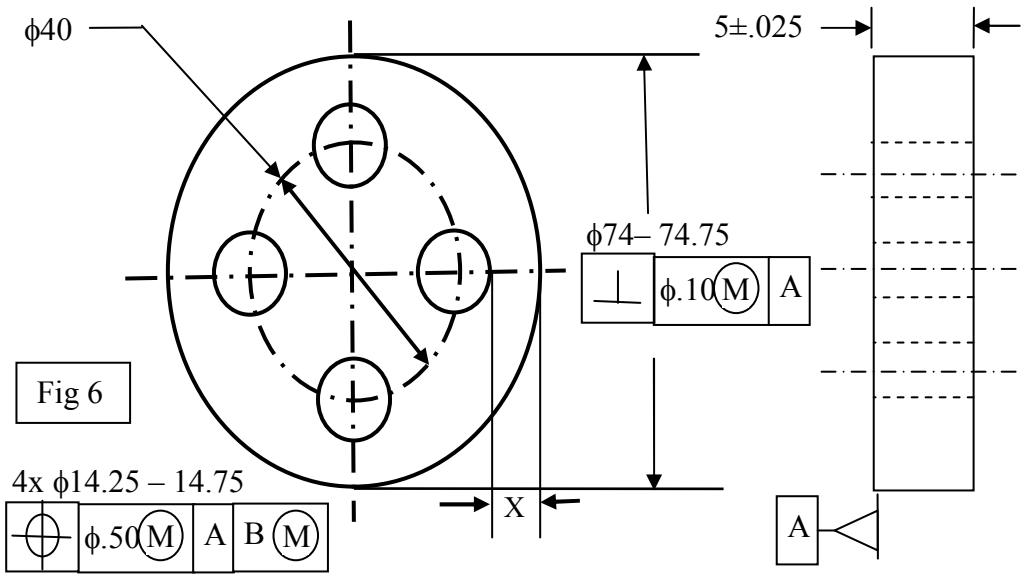

Fig 6

For the illustration given in Fig 6, calculate the minimum wall thickness X.

Q.4 **(a)** With the help of a suitable example explain how to (i) simulate a datum feature and (ii) construct a valid primary datum plane **06**

(b) For the shaft specifications given in figure 7, schematically specify: MMC, virtual condition, positional tolerance zone, and resultant condition **06**

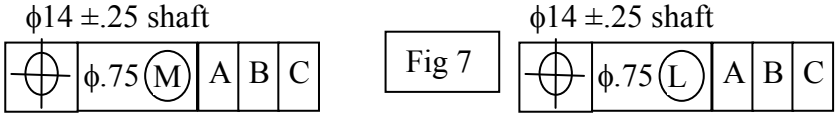

Fig 7

OR

Q.4 **(a)** With the help of a suitable example explain(i) the effects of differing datum precedence and (ii) cylindrical datum feature **06**

(b) For the hole specifications given in figure 8, schematically specify: MMC, virtual condition, positional tolerance zone, and resultant condition 06

Fig 8

Q.5 **(a)** Compare and contrast the following with the help of a suitable example (i) positional co-axiality, circular run out and total run out **06**

(b) How will you tolerance holes having floating fasteners and fixed fasteners as mating parts? **06**

OR

Q.5 **(a)** With the help of suitable examples explain the concept of zero tolerancing at MMC **06**

(b) Design a part that will mate with the component shown in figure 9 **06**

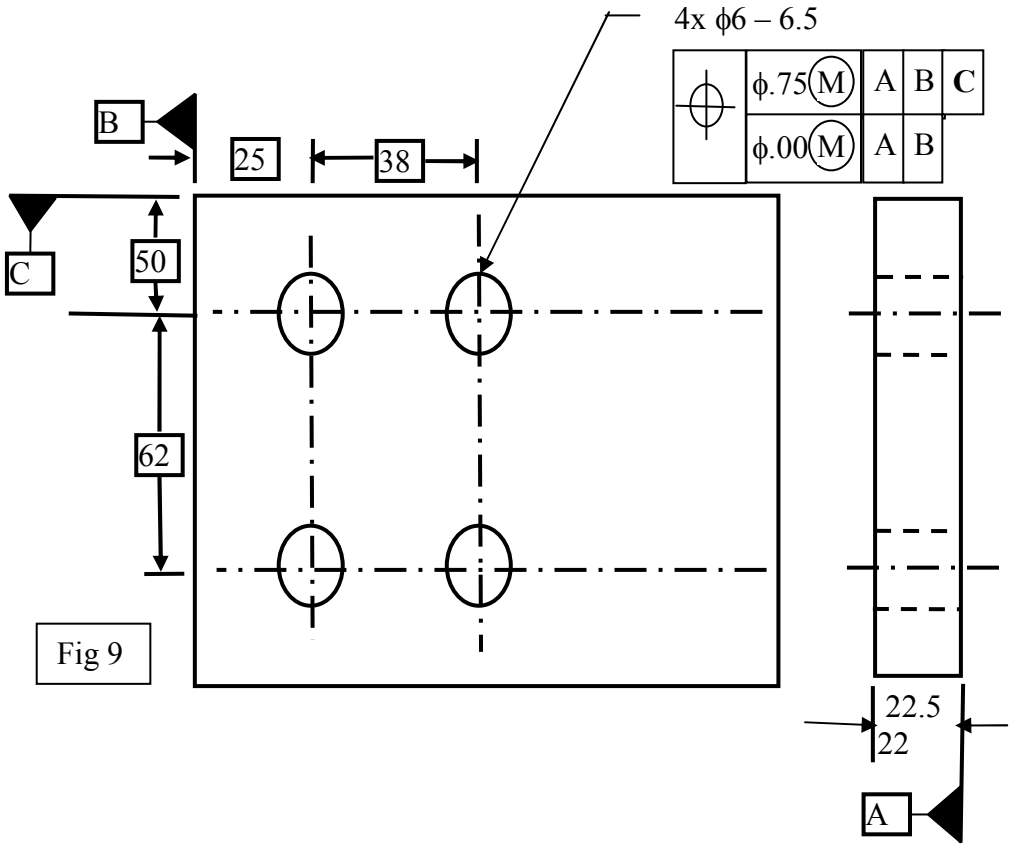

Fig 9

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