



University Of Technology  
Building and Construction Eng. Dept.  
Final Exam-2014/2015- First Attempt  
Subject : Cartography (2)



Class: 2<sup>nd</sup> year

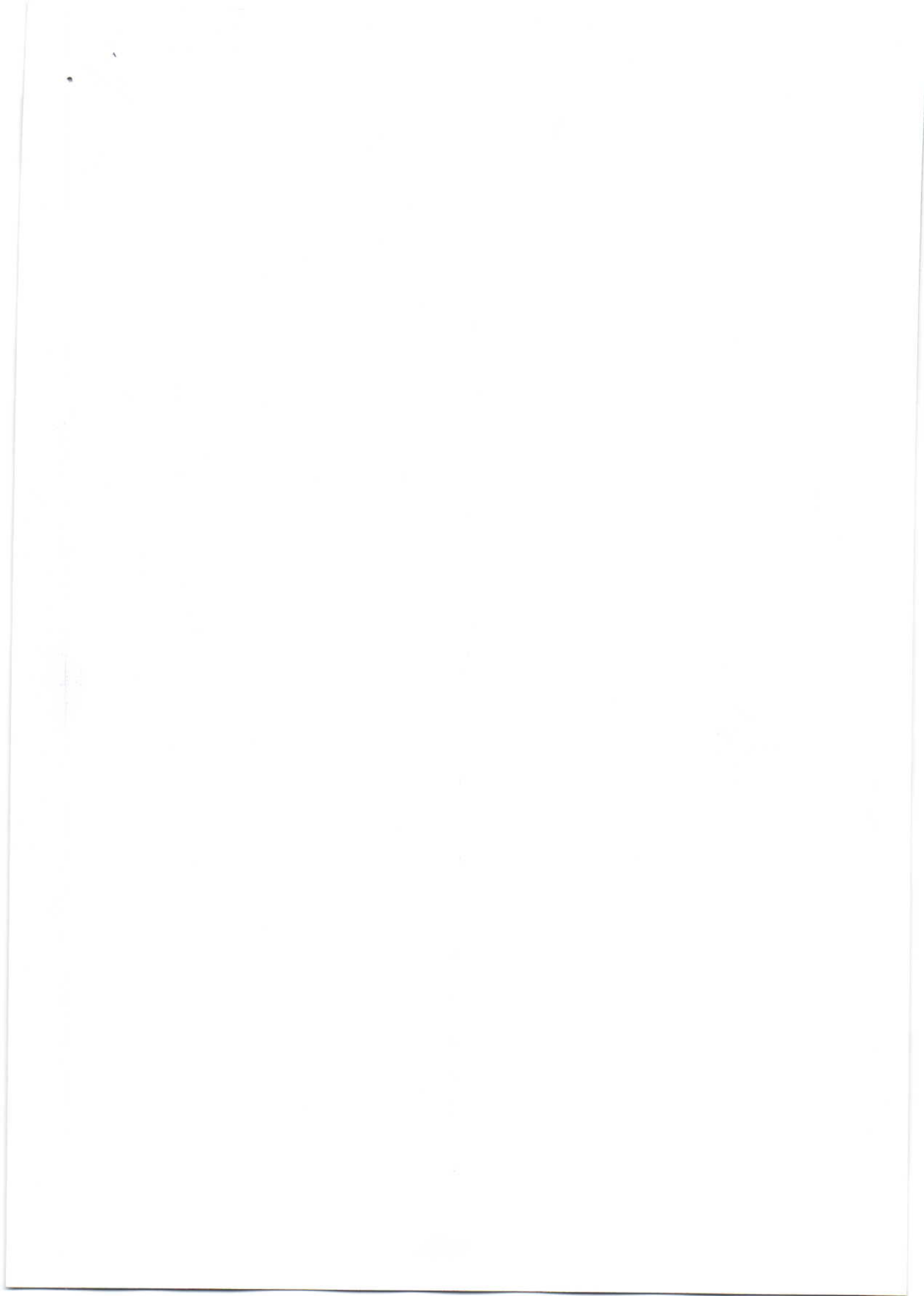
Time : 3 Hours

Date : 25/5/2016

Note: (8) Eight Questions Only

- 1) Find the suitable standard scale to plot (818 m ,1012 m) two times on a paper (70 cm x 100 cm), neglect 2 cm from each side of paper, then find the dimensions of the area on a chosen scale.
- 2) Find the values of convergence of map scale 1/50000 for all corners and center if the geographic coordinates of SW corner are:  
$$\phi = 28^{\circ}17'27'' , \lambda = 49^{\circ}45'30''$$
- 3) List methods of changing scale of maps and give a numerical example for each method (Draw each case).
- 4) Find the distance of object and image from photographic lens its focal length =150 mm, if the ratio of enlargement  $\left(\frac{u}{v} = \frac{7}{5}\right)$ .
- 5) Define and explain uses of: screen, negative and positive images, map projection, cartographic accuracy.
- 6) List kinds of coordinates systems on topographic maps and explain each one, then draw the relationship between them on UTM Zone (Draw the case).
- 7) List method of representation relief and explain two methods with drawings.
- 8) Show by drawing the geographic dimensions and the number of map of each map below, that lays on topographic map 1/250000:  
$$1/100000, 1/50000, 1/25000$$
- 9) Compute the accuracy values of maps scale:  
$$1/20000, 1/5000, 1/2500$$
- 10) Show the main formula of conformal projection and explain the condition of conformality.

**Good luck**





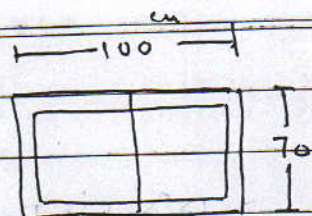
(Solutions)

$$\textcircled{1} | 100 - 4 = 96 \text{ cm}$$

$$70 - 4 = 66 \text{ cm}$$

$$\frac{96}{2} = 48 \text{ cm}$$

$$\frac{66}{2} = 33 \text{ cm}$$



$$\therefore S_1 = \frac{48}{1012 \times 100} = \frac{1}{2108}$$

$$S_2 = \frac{33}{818 \times 100} = \frac{1}{2478}$$

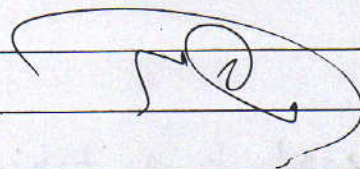
we choose the lower (smaller scale) value which is  $\frac{1}{2478}$

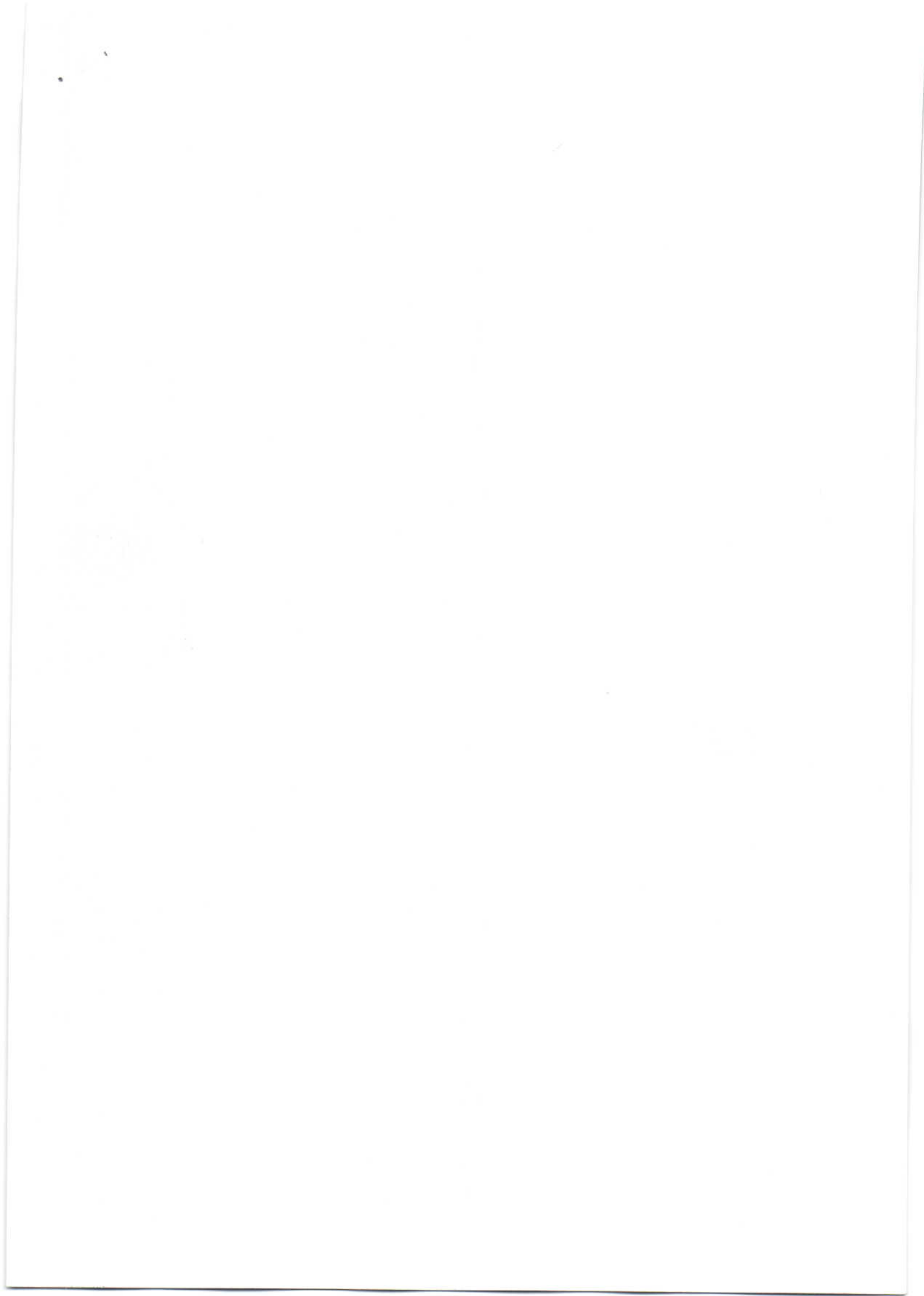
then we take a standard scale  $\Rightarrow \frac{1}{2500}$

$$\therefore \frac{1}{2500} \times 101200 = 40.48 \text{ cm}$$

$$\frac{1}{2500} \times 81800 = 32.72 \text{ cm}$$

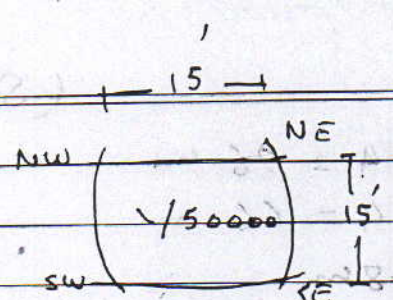
} The new dimensions of land in a chosen standard scale







①2)



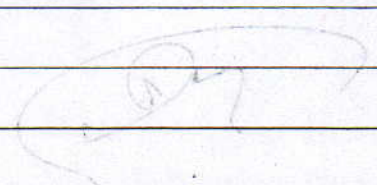
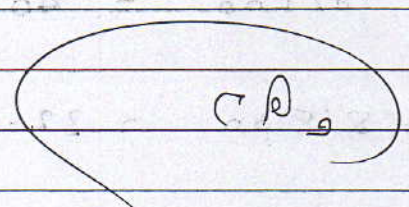
$$S_{SW} = D \lambda \sin \phi = (51^\circ - 49^\circ 45' 30'') \times \sin 28^\circ 17' 27'' = 0^\circ 35' 18.54''$$

$$S_{NW} = (51^\circ - 49^\circ 45' 30'') \times \sin 28^\circ 32' 27'' = 0^\circ 35' 35.7''$$

$$S_{SE} = (51^\circ - (49^\circ 45' 30'' + 15')) \times \sin 28^\circ 17' 27'' = 0^\circ 28' 11.99''$$

$$S_{NE} = (51^\circ - (49^\circ 45' 30'' + 15')) \times \sin (28^\circ 17' 27'' + 15') = 0^\circ 28' 25.69''$$

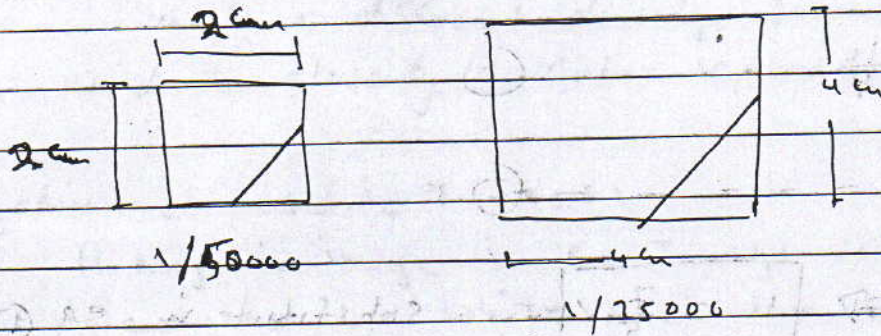
$$S_{\text{Center}} = (51^\circ - (49^\circ 45' 30'' + 0^\circ 7' 30'')) \times \sin (28^\circ 17' 27'' + 0^\circ 7' 30'') = 0^\circ 31' 52.99''$$



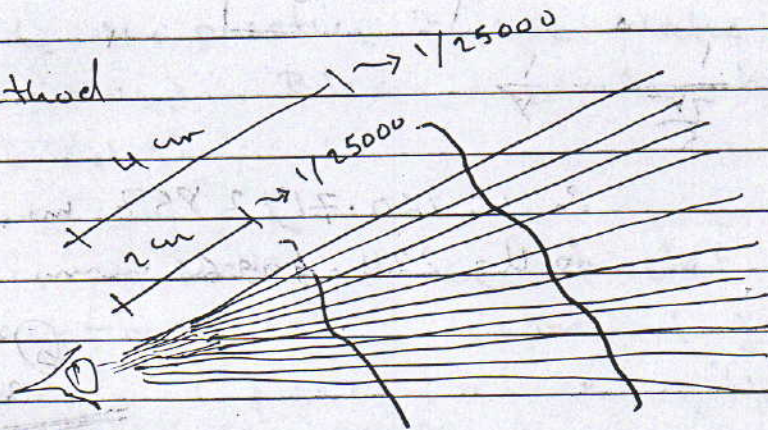


Q3) The main methods of changing scale are

1) Square method:



2) Triangle method



3) photographic method: using Newton law of photography

$$\frac{1}{F} = \frac{1}{u} + \frac{1}{v}$$

where  $F$ : Focal length

$u$ : the distance between object and lens

$v$ : the distance between image and lens

$\frac{u}{v}$  = enlargement ratio

$\frac{v}{u}$  = shortage ratio

2/6