



INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR  
Mid-Spring Semester 2017-18

Date of Examination: \_\_\_\_\_ Session (FN/AN) \_\_\_\_\_ Duration: 2 hrs Full Marks 60  
Subject No.: MI21002 \_\_\_\_\_ Subject: MINE SURVEYING \_\_\_\_\_  
Department/Center/School: Mining Engineering Department \_\_\_\_\_  
Specific charts, graph paper, log book etc., required \_\_\_\_\_  
Special Instructions (if any): Answer all parts of the same question at the same location. Put  
down all your assumptions for solving the problems with proper justification.

GROUP- A

(Marks-20)

Q.1. (a) Explain the following terms:

(2X 5=10)

- (i) Representative Fraction
  - (ii) Tallies or Tally marks in chain
  - (iii) Magnetic Meridian through a point
  - (iv) Fore and back bearing of a line
  - (v) Declination of a place
- (b) A 20 m chain used for survey was found to be 20.10 m at the beginning and 20.30 m at end of the work. The area of the plan drawn to a scale of 1 cm = 8 m, was measured with the help of a planimeter and was found to be 32.56 cm<sup>2</sup>. Find the true area of the field. (05)
- (c) Magnetic bearing of line AB is 130°20' and that of line BC is 252°45'. Find the clockwise angle from line AB to line BC. If the declination of the place is 8°30' E, find the true bearing of the lines AB and BC. (05)

GROUP- B

(Marks-40)

Q.2. (a) Explain the following:

(2X 5=10)

- (i) Baseline in a field survey
  - (ii) Differences between trilateration and triangulation
  - (iii) A polygonal chain and a simple chain based triangulation
  - (iv) Different orders of triangulation schemes
  - (v) Triangulation over curved surfaces of earth
- (b) Describe the steps used in computing a triangulation survey network following both the two versions / algorithms. (05)
- (c) Describe a tabular representation of the nine essential parameters for different types of triangles used for any field geodetic survey network. Also explain each of the parameters towards its influence in the final computation of the survey error. (05)

Q.3. (a) Explain the meaning and importance of contours for mine surveying processes. Mention any six characteristics of contour lines and any five uses of contours in mining engineering. What are the different methods for generation of contours, mention and explain each of them in brief with proper diagrams. (10)

(b) Draw the contour lines for the following conditions: (05)

- (i) Ridge structure on ground
- (ii) Valley structure of ground
- (iii) A spherical depression on the tops of a hill
- (iv) A spherical depression on the side slope of a hill structure
- (v) Explain the execution and the basic output of the following lines of codes when it is run

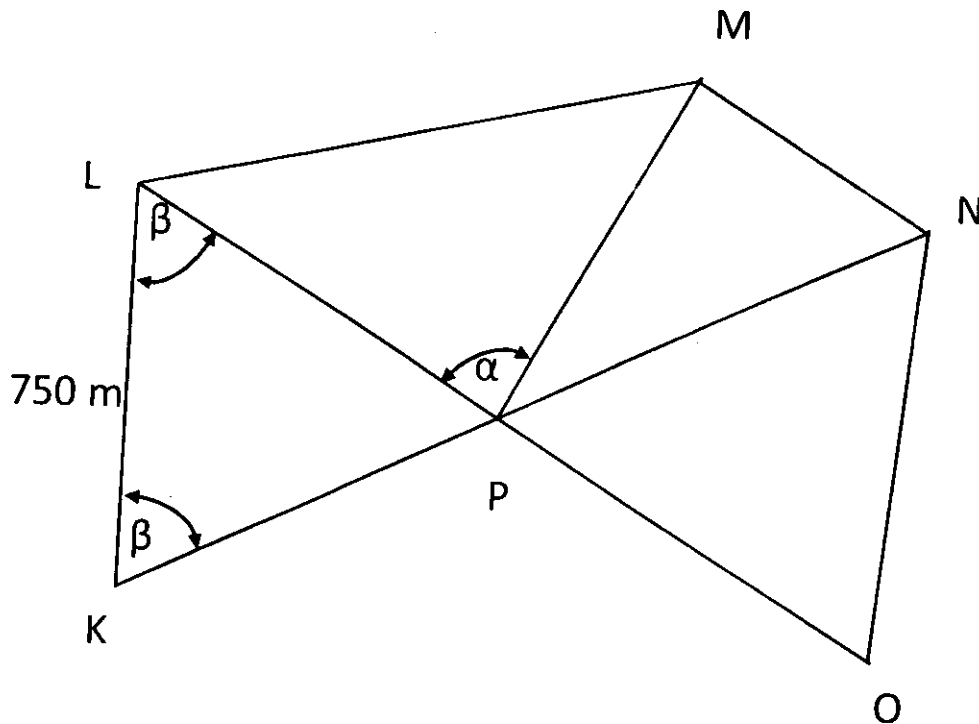
```

x = -2:1.0:2;
y = -2:1.0:2;
[X,Y] = meshgrid(x,y);
Z = (-X.^2-Y.^2);
figure
contour(X,Y,Z,'ShowText','on')

```

Provide your assumptions for generating the contour lines.

- (c) Given a polygon as shown in figure which is a part of huge triangulation survey network on flat ground. The straight lines KN and LO are equal in length and the point P is located at their midpoint. The azimuth of line LM is 250 degrees. It the angle  $\beta = 75$  degrees and the length of  $KL = 750$  m, then determine the length of MN. Given that angle  $\alpha = 90$  degrees. (05)



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