

**B. E. (5th Semester, Mining) Semester Examination, 2012
Advanced Surveying (MN503)**

Full Marks:70

Time: 3hours

Answer six questions taking three from each half.

Question No.1 and 6 are compulsory

Figures on the right-hand side margin indicate full marks

Ist Half

1. a. Describe the different errors in GNSS surveying.
b. Define: Law of accidental error, Weight of an observation, Conditioned quantity.
c. What are the different methods of correlation?
d. Describe the principle of trigonometrical levelling.

(5+3+3+4)
2. a. Describe the alignment and Weiss method of correlation survey.
b. What are the precautions to be taken while undertaking a correlation survey?

(7+3)
3. a, Define the followings :
 1. Deflection angle.
 2. Reverse Curve.
 3. Tangent points
 4. Point of intersection.
 5. Left Handed curve
 6. Angle of intersection

b. Describe the method of ranging an underground curve by chord and offset method.
Deduce the distance of chord offset and tangent offset in ranging the curve.

(3+3+4)
4. a. What are the different types of errors? Describe them.
b. Find the most probable value of the angles A, B and C from the following observations of equal weight.
$$A = 45^{\circ} 27' 11.04''$$
$$B = 56^{\circ} 40' 30.22''$$
$$A + C = 105^{\circ} 07' 40.65''$$

$$B + C = 96^{\circ} 36' 59.87''$$

$$C = 39^{\circ} 56' 28.24''$$

$$A + B + C = 145^{\circ} 04' 11.33''$$

(4+6)

5. a. Determine the distance and elevation of the staff station by tacheometric method when the line of collimation is inclined to the horizontal and the staff is held vertically

b. Methods of stope surveying

(6 +4)

Second Half

~~Answer question number 6 and any two from the rest~~

6. Write short notes on: Geoid and Spheroid, UTM, Water Danger Plan, ECEFXYZ

(4+4+4+3)

7. You are given lease of a large virgin area of land for detailed exploration and mining. Enumerate and detail the steps you will adopt for surveying and preparation of plan of the entire leasehold area in national grid coordinates. (10)

8. An underground Longwall mine has working panels, one under development and the other under extraction, working with a single seam opened by two inclines. Draw underground plan following the guidelines provided in coal mines regulations of the mine stating your assumptions therein. Show position of the workings, shafts, boreholes, surface contours, main and trunk roadways, position of goaf etc. (10)

9. A 5 m thick seam is developed by bord and pillar method to a thickness of 3 m from the floor with 48 m pillars, center to center, and 4 m gallery. Calculate the percentage of extraction during development. The seam is proposed to be depillared full thickness with complete sand stowing by splitting the pillars with a level gallery of same width as the main gallery. Find out the volumetric ratio between the coal taken during depillaring and the sand required to pack the entire goaf. (10)

10. a) Coal is stored in a square bay measuring 12 m square. The depth of the stack is 3.6 m. The height of retaining wall is 1.5 m and the coal slopes at 45 degree above these walls. Calculate the volume of coal in the stack.

b) A chain line, 60 meters in length, runs between the extreme ends of a boundary fence. Offsets are measured at equidistant points. The measurements are 0, 30.8, 50.6, 65, 66, 67.2, 64, 50, 34.2, 20.9, 15, 8, 0. Find the area of the line between the chain line and boundary fence. (5+5)