

22377

22232

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE :**

10

- (a) State the uses of transit theodolite.
- (b) State in brief the purpose of Mine Correlation Survey.
- (c) Define the degree of curve.
- (d) State the uses of Total station.
- (e) State the applications of remote sensing in brief.
- (f) State the application of GIS in brief.
- (g) Explain the term 'Remote Sensing'.



2. Attempt any THREE :**12**

- (a) Describe the below mentioned parts of theodolite :
- (i) Vertical circle
 - (ii) Horizontal circle
 - (iii) Telescope
 - (iv) Foot screws
- (b) Describe the Welsbach triangle method of correlation.
- (c) Classify the circular curves & explain.
- (d) Describe the application of total station in Mining.

3. Attempt any THREE :**12**

- (a) Following are the lengths & bearings of traverse ABCD :

Line	Length in Meters	Bearing
AB	258.0	30°
BC	321.0	140°
CD	180.0	210°

Calculate the length & bearing of the line DA.

- (b) Following latitudes & departures were observed while running a closed traverse, find out the independent co-ordinates :

Line	N	S	E	W
AB	_____	182.83	313.12	_____
BC	244.72	_____	470.12	_____
CD	495.17	_____	_____	381.34
DE	_____	268.99	_____	388.46
EA	_____	268.27	_____	13.44

- (c) Describe the use of drone surveying in mining.
- (d) State the use of GPS in mining.
- (e) Compare the active & passive system of remote sensing opencast metalliferous mines.

4. Attempt any THREE : 12

- (a) State the step wise procedure for measurement of horizontal angle using theodolite.
- (b) State the temporary adjustment of total station.
- (c) Explain the working principle of G.P.S. and describe with a neat sketch.
- (d) Describe GIS technology and its use in mining.

5. Attempt any TWO : 12

- (a) Interior angles of a closed traverse ABCD are as given below :

Angle A = $95^{\circ} 15' 0''$

Angle B = $88^{\circ} 31' 0''$

Angle C = $90^{\circ} 13' 0''$

Angle D = $86^{\circ} 01' 0''$

If the observed bearing of line AB is $86^{\circ} 40' 0''$. Calculate the bearing of the remaining sides.

- (b) List the methods of correlation of surface & underground survey. Explain any one method in brief.
- (c) Describe the Rankine method of tangential angles for setting out horizontal curve.

6. Attempt any TWO : 12

- (a) Two straights intersect at a chainage 1250 m. with deflection angle 30° . Calculate the following data necessary to set a curve of radius 250 m by Rankine's method of deflection angle :
 - (1) Length of tangent
 - (2) Chainage of first tangent
 - (3) Length of curve
 - (4) Chainage of second tangent

- (b) Following are the details of the observations made in connection with correlation with Welsbach triangle method. A & B are the two plumb lines suspended from the PIT Top of the PIT. D & E are the stations in the underground traverse survey which is required to be connected with the surface survey. Bearing of AB as found from the surface is $40^{\circ} 40' 00''$ and the length of AB is 2.286 meters.

The observations obtained in underground are :

$$AB = 2.286 \text{ m}$$

$$BC = 2.621 \text{ m}$$

$$AC = 4.907 \text{ m}$$

$$CD = 18.348 \text{ m}$$

$$DE = 30.480 \text{ m}$$

$$\text{Angle BCD} = 181^{\circ} 00' 00''$$

$$\text{Angle CDE} = 96^{\circ} 00' 00''$$

$$\text{Welsbach angle ACB} = 0^{\circ} 1' 40''$$

Find the bearing of underground drift DE.

- (c) Explain the principle of EDM and state its uses.
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