

22377

23124

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 of the following :

10

- (a) Write any two uses of transit theodolite.
- (b) Define Weisbach triangle.
- (c) Define degree of curve in Highway practice and Railway practice.
- (d) Enlist any two uses of total station.
- (e) Define remote sensing.
- (f) State the meaning of changing the face while using theodolite
- (g) State any two uses in mining industry of G.P.S.



2. Attempt any THREE of the following :**12**

- (a) In theodolite survey, state the functions of the following components of theodolite :
- (i) Eye piece
 - (ii) Vertical circle
 - (iii) Horizontal circle
 - (iv) Diaphragm
- (b) Describe coplaning or exact alignment method of correlation survey for surface and underground working of a mine.
- (c) Enlist the different curves used in mines and describe in brief the transition curve.
- (d) Describe the main component parts of total station.

3. Attempt any THREE of the following :**12**

- (a) The following data was collected in connection with closed traverse PQRSP :

Line	Length (m)	Bearing
PQ	780	135°45'
QR	2000	32°24'
RS	390	340°00'
SP	?	?

Calculate the missing length & bearing of SP.

- (b) The co-ordinates of the two points L and M are as under :

Point	North	East
L	405.50 m	630.60 m.
M	755.50 m	310.60 m.

Find the length and bearing of line LM.

- (c) State the basic components of a GPS receiver. Draw a concept diagram of GPS receiver unit.
- (d) Elaborate the uses of Drone surveying in mining industry.
- (e) Distinguish between active system and passive system of remote sensing.
- 4. Attempt any THREE of the following : 12**
- (a) Explain the temporary adjustment of theodolite.
- (b) Describe the use of different function keys in working with total station.
- (c) Explain the principle of GPS with labelled diagram.
- (d) Draw a schematic diagram of Geographical Information System (GIS) used in opencost mine.
- 5. Attempt any TWO of the following : 12**
- (a) Describe the procedure for measurement of Horizontal angle $45^{\circ}20'30''$ using transit theodolite.
- (b) Describe the correlation survey. Enumerate the different methods of correlation of surface and underground survey. State the accuracy permissible in such surveys.
- (c) Describe in detail how would you set out a curve by chords and angles having 30 m radius, to join two underground roadways at right angles to each other.
- 6. Attempt any TWO of the following : 12**
- (a) Two tangents PQ and QR intersect at point Q at a chainage of 200 m. Calculate the following data for circular of radius 100 m and deflection angle 40° :
- (i) Tangent length
- (ii) Length of curve
- (iii) Length of chord
- (iv) Chainage of points T_1 and T_2

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

Observation obtained in underground are :

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

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

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

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

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

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

$$\text{Angle CDE} = 0^{\circ} 1' 40''$$

Find the bearing of underground drift DE.

- (c) Elaborate the construction of E.D.M. along with function of its components.
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