

Q1. A line of true length 500 m when measured by a 20 m tape is reported to be 502 m long. The correct length of the tape is

- (a) 19.92 m
- (b) 20.08 m`
- (c) 20.80 m
- (d) 21 m

Q2. Normal tension is that pull which

- (a) is used at the time of standardizing the tape
- (b) neutralizes the effect due to pull and sag
- (c) makes the correction due to sag equal to zero
- (d) makes the correction due to pull equal to zero

Q3. The length of a base line is measured on ground at an elevation of 300 metres above means sea level is 2250 millimetres. The required correction to reduces to sea level length (given Radius of earth = 6370 m) will be

- (a) 106 mm
- (b) 206 mm
- (c) 306 mm
- (d) 212 mm

Q4. In an old map a line was drawn to a magnetic bearing of $10^{\circ}30'$, the magnetic declination being 2° East at that time. The magnetic bearing to which the line should be set now if the present magnetic declination is $4^{\circ}30'$ west

- (a) 17°
- (b) 15°
- (c) 10°
- (d) 8°

Q5. Contour interval is

- (a) inversely proportional to the scale of the map.
- (b) directly proportional to the flatness of ground.
- (c) large for accurate works.
- (d) None of these

Q6. Which of the following methods of contouring is most suitable for a hilly terrain?

- (a) direct method
- (b) square method
- (c) cross-sections method
- (d) tacheometric method

Q7. The curvature of the earth's surface, is taken into account only if the extent of survey is more than

- (a) 100 sq km
- (b) 160 sq km
- (c) 200 sq km
- (d) 260 sq km

Q8. During levelling if back sight is more than foresight

- (a) The forward staff is at lower point
- (b) The back staff is at lower point
- (c) The difference in level cannot be ascertained
- (d) None of these

Q9. In reciprocal levelling, the error which is not completely eliminated, is due to

- (a) earth's curvature
- (b) non-adjustment of line of collimation
- (c) refraction
- (d) non-adjustment of the bubble tube

Q10. Match List-I with List-II and select the correct answer using the codes given below the Lists :

List – I

- A. Reciprocal levelling
- B. Trigonometrical levelling
- C. Hypsometry
- D. Profile levelling

List – II

- 1. Involves measuring of horizontal distances and vertical angles in field
- 2. Involves the principle of boiling point of water variation with altitude
- 3. Involves observing elevations of a number of points along the centre line and their distance along it
- 4. Involves the principle of two peg test

Codes :

	A	B	C	D
(a)	4	1	2	3
(b)	4	2	3	2
(c)	4	1	3	2
(d)	1	2	3	4

Q11. The RL, of the point A which is on the floor is 100m and back sight reading on A is 2.455 m. If the foresight reading on the point B which is one the ceiling is 2.745 m, the RL of point B will be

- (a) 94.80 m
- (b) 99.71 m
- (c) 100.29 m
- (d) 105.20 m

Q12. Curvature correction to a staff reading in a differential levelling survey is

- (a) always subtractive
- (b) always zero
- (c) always additive
- (d) dependent on latitude

Q13. The bubble tube parallel to the telescope of a theodolite should be more sensitive, since it controls.

- (a) Vertical axis
- (b) Horizontal axis
- (c) Axis of bubble tube
- (d) None of these

Q14. The method of orienting a plane table with two inaccessible points is known as

- (a) intersection resection
- (b) resection
- (c) back sighting
- (d) two-point problem

Q15. A transition curve is required for a circular curve of 200 m radius, the gauge being 1.5 m and maximum superelevation restricted to 15 cm. The transition is to be designed for a velocity such that no lateral pressure is imposed on the rails and rate of gain of radial acceleration is 30 cm/s^2 . The required length of transition curve will be

- (a) 460 m
- (b) 46 m
- (c) 4.6 m
- (d) 0.46 m

Q16. A vertical photograph was taken from an aircraft flying at an altitude of 2000 m above mean sea level. The focal length of the camera is 175 mm. The scale of the photograph for a hill of an elevation of 250 m is

- (a) 1/10000
- (b) 1/150000
- (c) 1/200000
- (d) 1/25000

Q17. Which one of the following surveys is required in observations of stars ?

- (a) Astronomical survey
- (b) Cadastral survey
- (c) Aerial survey
- (d) Photogrammetric survey

Q18. Which one of the following gives the correct distance between the lighthouse and a ship, when the lighthouse whose height is 100 m is visible just above the horizon from the ship?

- (a) 30.68 km
- (b) 36.50 km
- (c) 38.54 km
- (d) 40.54 km

Q19. A 'level line' is a

- (a) horizontal line
- (b) line parallel to the mean Spheroidal surface of earth
- (c) line passing through the centre of cross hairs and the centre of eye piece
- (d) line passing through the objective lens and the eyepiece of a dumpy or tilting level

Q20. As applied to staff readings, the corrections for curvature and refraction are respectively

- (a) + and –
- (b) – and +
- (c) + and +
- (d) – and –

Q21. Which one of the following surveys is employed for collecting sufficient data in connection with sewage disposal and water supply works ?

- (a) Topographic survey
- (b) Cadastral survey
- (c) Geodetic survey
- (d) Cross-sectioning and profile levelling

Q22. Theory of errors and adjustments deals with minimizing the effects of

- (a) instrumental errors
- (b) mistakes
- (c) systematic errors
- (d) personal and accidental errors

Q23. The error due to bad ranging is

- (a) cumulative; positive
- (b) cumulative; negative
- (c) compensating
- (d) cumulative; positive or negative

Q24. The shrinkage factor of an old map is found to be 15/16 and the representative fraction of the map is 1/1600. The corrected scale for the map is

- (a) 1/1600
- (b) 1/1500
- (c) 1/1706.6
- (d) None of these

Q25. If L is the measured length of a line, then the compensating errors are proportional to

- (a) L^3
- (b) L^2
- (c) L
- (d) \sqrt{L}

Q26. Determining the relative positions of points on above or beneath the surface of the earth by means of direct or indirect measurements of distance and direction and elevation is called as _____

- (a) Surveying
- (b) Levelling
- (c) Measuring
- (d) Contouring

Q27. Which of the following is made in connection with the construction of streets, water supply systems, sewers?

- (a) Traverse surveying
- (b) Hydrographic surveying
- (c) Cadastral surveying
- (d) City surveying

Q28. Which instrument mechanism is operated by motion of the body and it automatically registers the number of paces, thus avoiding the monotony and strain of counting the paces, by the surveyor?

- (a) Passometer
- (b) Pedometer
- (c) Odometer
- (d) Chaining

Q29. Chains are made up of _____

- (a) High steel carbon
- (b) Galvanized mild steel
- (c) Copper coated iron
- (d) Iron

Q30. The length of the chain is measured from the outside of one handle to the _____ of the other handle.

- (a) Inside
- (b) Outside
- (c) Centre
- (d) Before one link

Q31. Length of Gunter's chain is _____

- (a) 10ft
- (b) 33ft
- (c) 66ft
- (d) 100ft

Q32. Process of fixing or establishing intermediate points is known as _____

- (a) Chaining
- (b) Ranging
- (c) Contouring
- (d) Levelling

Q33. Which line passes through a point, such that plane passing that point and the north and south poles, intersects with the surface of the earth?

- (a) True Meridian
- (b) Magnetic Meridian
- (c) Arbitrary Meridian
- (d) Survey line

Q34. Horizontal angle with the true Meridian through one of the extremities of the line is called?

- (a) True bearing
- (b) Magnetic Bearing
- (c) Arbitrary bearing
- (d) Bearing

Q35. The Magnetic Bearing of a line is $48^{\circ}24'$. Calculate the true bearing if the magnetic declination is $5^{\circ}38'$ East.

- (a) $54^{\circ}02'$
- (b) $44^{\circ}02'$
- (c) $54^{\circ}22'$
- (d) $45^{\circ}02'$

Q36. The magnetic bearing of a line AB is $S 28^{\circ}30' E$. Calculate the true bearing if the declination is $7^{\circ}30'$ West.

- (a) $N 36^{\circ}00' W$
- (b) $S 21^{\circ}00' E$
- (c) $S 36^{\circ}00' E$
- (d) $N 21^{\circ}00' W$

Q37. The length of a line measured with a 20 m chain was found to be 250 m. Calculate the true length of the line if the chain was 10 cm too long.

- (a) 252.25 m
- (b) 251.25 m
- (c) 225.25 m
- (d) 221.25 m

Q38. A surveyor measured the distance between two points on the plan drawn to a scale of 1 cm is equal 40 m and the result was 468 m. But, actual scale is 1 cm = 20 m. Find the true distance between the two points.

- (a) 992 m
- (b) 936 m
- (c) 987 m
- (d) 967 m

Q39. A line which joins subsidiary stations on the main line is called _____

- (a) Tie line
- (b) Survey lines
- (c) Base lines
- (d) Check lines

Q40. In which type of surveying only linear measurements are made?

- (a) Contouring
- (b) Chain surveying
- (c) Theodolite surveying
- (d) Dumpy level

Q41. The accuracy in the location of the objects depends upon the accuracy in laying the _____

- (a) Check line
- (b) Base line
- (c) Tie line
- (d) Survey line

Q42. What are used to mark the positions of the stations or terminal points of survey line?

- (a) Arrows
- (b) Pegs
- (c) Ranging rods
- (d) Plumb bob

Q43. What is the first principle of surveying?

- (a) Part to whole
- (b) Whole to part
- (c) Whole to whole
- (d) Part to part

Q44. What is the last step in chain surveying?

- (a) Reconnaissance
- (b) Marking
- (c) Fixing
- (d) Running survey lines

Q45. What is the horizontal angle which it makes with the true meridian through one of the extremities of the line?

- (a) True bearing
- (b) Magnetic bearing
- (c) Arbitrary bearing
- (d) Dip

Q46. Convert $122^{\circ}30'$ whole circle bearings to quadrant bearings?

- (a) $180 - 122^{\circ}30'$
- (b) $122^{\circ}30'$
- (c) $360 - 122^{\circ}30'$
- (d) $270 - 122^{\circ}30'$

Q47. Convert $22^{\circ}30'$ whole circle bearings to quadrant bearings?

- (a) $180 - 22^{\circ}30'$
- (b) $22^{\circ}30'$
- (c) $360 - 22^{\circ}30'$
- (d) $270 - 22^{\circ}30'$

Q48. The horizontal angle between the true meridian and the magnetic meridian shown by needle at the time of observation is called _____

- (a) True bearing
- (b) Magnetic bearing
- (c) Arbitrary bearing
- (d) Magnetic declination

Q49. _____ is defined as a curved surface which at each point is perpendicular to the direction of gravity at the point.

- (a) Level surface
- (b) Level line
- (c) Horizontal plane
- (d) Datum

Q50. Which process of levelling in which the elevations of points are computed from the vertical angles and horizontal distances measured in the field?

- (a) Barometric levelling
- (b) Trigonometric levelling
- (c) Spirit levelling
- (d) Traverse levelling

Solutions

S1. Ans.(a)

Sol. Correct length of tape = $\frac{500}{502} \times 20 = 19.92 \text{ m}$

S2. Ans.(b)

Sol. Normal tension is that pull which neutralizes the effect due to pull and sag.

S3. Ans.(a)

Sol. Correction to MSL = $\frac{Lh}{R} = \frac{300 \times 2.25}{6370} = 0.106 \text{ m} \approx 106 \text{ mm}$

S4. Ans.(a)

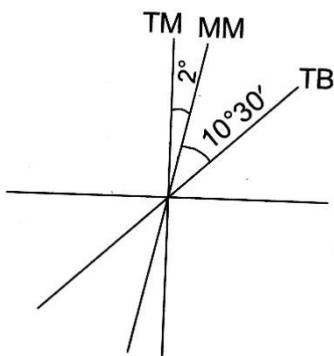
Sol. True bearing of drawing = $10^\circ 30' + 2^\circ = 12^\circ 30'$.

TB = MB at present \pm declination at present.

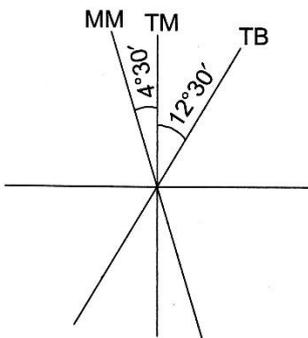
$$12^\circ 30' = (\text{MB})_{\text{present}} - 4^\circ 30'$$

$$\therefore (\text{MB})_{\text{present}} = 12^\circ 30' + 4^\circ 30' = 17^\circ$$

Alternate Method



$$\text{TB} = \text{MB} + \text{Declination} = 2^\circ + 10^\circ 30' = 12^\circ 30'$$



$$\text{MB} = \text{TB} + \text{Declination} = 4^\circ 30' + 12^\circ 30' = 17^\circ$$

S5. Ans.(a)

Sol. . Contour interval is inversely proportional to the scale of the map

S6. Ans.(d)

Sol. tacheometric method of contouring is most suitable for a hilly terrain

S7. Ans.(d)

Sol.

S8. Ans.(b)

Sol.

S9. Ans.(c)

Sol.

S10. Ans.(a)

Sol.

S11. Ans.(d)

Sol. Since the staff at the elevated point B on the ceiling is held vertically inverted.

$$RL \text{ of B} = RL \text{ of A} + B.S. \text{ on A} + FS \text{ on B} = 100 + 2.455 + 2.745 = 105.20 \text{ m}$$

S12. Ans.(a)

Sol.

S13. Ans.(b)

Sol.

S14. Ans.(d)

Sol.

S15. Ans.(b)

$$\text{Sol. } v^2 = \frac{0.15}{1.5} \times 9.81 \times 200$$

$$\Rightarrow v = 14 \text{ m/s}$$

$$\therefore l = \frac{14^3}{0.3 \times 200} \cong 46 \text{ m}$$

S16. Ans.(a)

Sol.

S17. Ans.(a)

Sol. Cadastral survey is used to plot the details such as boundaries of fields, houses and property lines in rural and urban areas. These are also known as public land surveys.

Photogrammetry is used to produce a mosaic or map by compiling the photographs. Aerial survey covers photogrammetry and photo-interpretation both.

S18. Ans.(c)

Sol. If d is distance to the visible horizon, it is given by,

$$d = 3.8553\sqrt{C} \text{ km}$$

'C' being in metres,

$$\therefore d = 3.8553\sqrt{100} = 38.553 \text{ km}$$

S19. Ans.(b)

Sol.

S20. Ans.(b)

Sol.

S21. Ans.(d)

Sol.

S22. Ans.(d)

Sol. Systematic or cumulative errors which occurs from well understood causes can be reduced by adopting suitable methods. If follows some definite mathematical or physical law and a correction can be determined and applied. Accidental errors and those which remain after mistakes and systematic errors have been eliminated and are caused by a combination of reasons beyond the ability of the observer to control. Personal errors arise from the limitations of the human senses such as sight, touch and hearing. Both accidental and personal error represent the limit of precision in the determination of a value. They obey the law of probability and therefore theory of errors and adjustments applies to them.

S23. Ans.(a)

Sol.

S24. Ans.(c)

$$\text{Sol. Corrected scale} = \text{SF} \times \text{RF} = \frac{15}{16} \times \frac{1}{1600} \times \frac{1}{1706.6}$$

S25. Ans.(d)

Sol.

S26. Ans.(a)

Sol.

S27. Ans.(b)

Sol. Explanation: City surveying is made in connection with the construction of streets, water supply systems and sewers. A survey which deals with bodies of water for purpose of navigation, water supply, harbor works or for the determination of mean sea level is hydrographic surveying.

S28. Ans.(a)

Sol. Explanation: Pedometer is a device similar to the passometer except that, adjusted to the length of the pace of the person carrying it. Passometer avoids the monotony and strain of counting the paces.

S29. Ans.(b)

Sol.

S30. Ans.(b)

Sol. Explanation: Length of chain is the end to end distance of complete chain. Chain length is the sum of lengths of all links.

S31. Ans.(c)

Sol.

S32. Ans.(b)

Sol. Explanation: If the length of the survey line exceeds the length of the chain, some intermediate points will have to establish in line with two terminal points before chaining is started. The process of fixing or establishing such intermediate points is known as Ranging.

S33. Ans.(a)

Sol. Explanation: True Meridian passes through the true north and south. Magnetic meridian is the imaginary line that connects magnetic south and north poles. Survey line is the line along which surveying is proceeds.

S34. Ans.(a)

Sol.

S35. Ans.(a)

Sol. Explanation: Magnetic Declination is the horizontal angle between true meridian and magnetic meridian. Declination = $+5^{\circ}38'$, magnetic bearing = $48^{\circ}24'$, then here, true bearing is sum of both i.e $48^{\circ}24' + 5^{\circ}38' = 54^{\circ}02'$.

S36. Ans.(c)

Sol. Explanation: Since the declination is to be west, the magnetic meridian will be to the west of the true meridian. Therefore, true bearing = $S 28^{\circ}30' E + 7^{\circ}30' = S 36^{\circ}00' E$.

S37. Ans.(b)

Sol. Explanation: Incorrect length of the chain is $20 + 10/100$, ie 20.1 m. Measured length is 250, hence true length of the line is $250 \times (20.1/20) = 251.25$ m.

S38. Ans.(b)

Sol. Explanation: Distance between two points measured with a scale of 1 cm to 20 m is $468/20 = 23.4$ cm. Actual scale of a plan is 1 cm = 40 m. True distance between the points is $23.4 \times 40 = 936$ m.

S39. Ans.(a)

Sol.

S40. Ans.(b)

Sol.

S41. Ans.(a)

Sol.

S42. Ans.(b)

Sol.

S43. Ans.(b)

Sol.

S44. Ans.(d)

Sol.

S45. Ans.(a)

Sol.

S46. Ans.(a)

Sol. Explanation: Reduced bearing = $180 - \text{Whole circle bearing}$ if R.B is lies between 90° and 180° . Therefore here R.B = W.C.B = N $22^\circ 30'E$.

S47. Ans.(b)

Sol. Explanation: Reduced bearing = Whole circle bearing if R.B is less than 90° .
Therefore here R.B = W.C.B = N $22^\circ 30'E$.

S48. Ans.(d)

S49. Ans.(a)

S50. Ans.(b)