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ZEAL POLYTECHNIC,PUNE

NARHE | PUNE -41 | INDIA

DEPARTMENT OF CIVIL ENGINEERING

FIRST YEAR (FY)

SCHEME: I **SEMESTER: III**

NAME OF SUBJECT: BASIC SURVEYING

Subject Code: 22205

UNIT WISE MULTIPLE CHOICE QUESTIONS BANK

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Question Bank for Multiple Choice Questions

Program: Diploma in Civil engineering	**Program Code:- CE**
Scheme:-II	**Semester:- II**
Course:- Basic Surveying	**Course Code:- 22205**
01 – Overview and Classification of Survey	**Marks:-06**

Content of Chapter:-

1.1 Survey- Purpose and Use, Principles of Survey

1.2 Types of surveying- Primary and Secondary classification, Plane, Geodetic, Cadastral, Hydrographic. Photogrammetric Aerial. Layout survey, Control survey, Topographical survey. Route survey. Reconnaissance survey,

1.3 Scales: Engineer's scale, RF and Diagonal scale.

1. What is Surveying?

a) Surveying is used to find the elevations of given points with respect to given or assumed datum
b) Surveying shows the relative positions of the objects on the surface of the earth
c) Surveying is to find the elevation of points having the same contour interval
d) All of the mentioned

Answer: b

Explanation: Surveying is defined as determining the relative positions of points above or beneath the surface of the earth by means of direct or indirect measurements of distance and direction and elevation.

2. What is the first principle of surveying?

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

Answer: d

Explanation: The first principle of surveying is to work from whole to part. Before starting the actual survey measurements, the surveying is to work from around the area to fix the best positions of survey lines and survey stations.

3. Which type of surveying is used for exploring mineral wealth?
a) Military surveying
b) Mine surveying
c) Topographic surveying
d) Engineering surveying
Answer: b
Explanation: For exploring mineral wealth mine surveying is used. Determining points of strategic importance is military surveying.

4. In which type of surveying only linear measurements are made?
a) Dumpy level
b) Theodolite surveying
c) Chain surveying
d) Contouring
Answer: c
Explanation: Chain surveying is the type of surveying in which only linear measurements are made in the field. This type of surveying is suitable for surveys of small extent on open take simple details.

5. Which of the following classification in surveying is based on the instrument used?
a) Traverse surveying
b) Cadastral surveying
c) Topographic surveying
d) Hydrographic surveying
Answer: a
Explanation: Topographic surveying, Hydrographic surveying, Cadastral surveying classification is based on the nature of field survey. Traverse surveying, chain surveying is classified based on the type of instrument used.

6. 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
Answer: d
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 the purpose of navigation, water supply, harbor works or for the determination of mean sea level is hydrographic surveying.

7. Which of the following is a classification based on the instrument used?
a) Topographic surveying
b) Hydrographic surveying
c) Cadastral surveying
d) Traverse surveying
Answer: d
Explanation: Topographic surveying, Hydrographic surveying, Cadastral surveying classification is based on the nature of field survey. Traverse surveying, chain surveying is classified based on the type of instrument used.

8. Determining points of strategic importance are called _____
a) Topographic surveying
b) City surveying
c) Military surveying
d) Traverse surveying
Answer: c
Explanation: Determining points of strategic importance is military surveying. City surveying is made in connection with the construction of streets, water supply systems and sewers.

9. For exploring mineral wealth which type of surveying is used?
a) Topographic surveying
b) Engineering surveying
c) Military surveying
d) Mine surveying
Answer: d
Explanation: For exploring mineral wealth mine surveying is used. Determining points of strategic importance is military surveying.

10. Determining quantities or afford sufficient data for the designing of works such as roads and reservoirs is called _____
a) Topographic surveying
b) Engineering surveying
c) City surveying
d) Cadastral surveying
Answer: b
Explanation: Determining quantities or afford sufficient data for the designing of works such as roads and reservoirs is engineering surveying. City surveying is made in connection with the construction of streets, water supply systems and sewers.

11. What consists of a horizontal and vertical location of certain points by linear and angular measurements and is made to determine the natural features of a country such as rivers, streams?
a) Topographic surveying
b) Engineering surveying
c) City surveying
d) Cadastral surveying
Answer: a
Explanation: Topographic surveying consists of the horizontal and vertical location of certain points by linear and angular measurements and is made to determine the natural features of a country such as rivers, streams etc. City surveying is made in connection with the construction of streets, water supply systems and sewers.

12. Which of the following is a classification based on the nature of the field survey?
a) Topographic surveying
b) Mine surveying
c) Military surveying
d) Chain surveying
Answer: a
Explanation: Chain surveying classification is based on instruments used. For exploring mineral wealth mine surveying is used.

13. Which of the following is not a classification based on instruments used or methods employed?
a) Chain surveying
b) Topographic surveying
c) Traverse surveying
d) Aerial surveying
Answer: b
Explanation: Topographic surveying classification is based upon the nature of the field survey. Chain surveying is classified based on the instrument used. Aerial surveying is classified based on the type of method employed.

14. A survey which deals with bodies of water for the purpose of navigation, water supply, harbor works or for the determination of mean sea level is _____
a) Topographic surveying
b) Hydrographic surveying
c) Cadastral surveying
d) City surveying
Answer: b
Explanation: Survey which deals with bodies of water for the purpose of navigation, water supply, harbor works or for the determination of mean sea level is hydrographic surveying.

15. 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
Answer: a
Explanation: Surveying is defined as determining the relative positions of points above or beneath the surface of the earth by means of direct or indirect measurements of distance and direction and elevation.

16. Finding the elevations of a point with respect to a given or assumed and establish points given elevation or at different elevations with respect to given or assumed dactum is _____
a) Surveying
b) Levelling
c) Bearing
d) Contouring
Answer: b
Explanation: Finding the elevations of a point with respect to a given or assumed and establish points given elevation or at different elevations with respect to given or assumed dactum is levelling.

17. Type of surveying in which the mean surface of the earth is considered as a plane and the spheroidal shape is neglected called as _____
a) Topographic Surveying
b) Hydrographic Surveying
c) Geodetic Surveying
d) Plane Surveying
Answer: d
Explanation: Type of surveying in which the mean surface of the earth is considered as a plane and the spheroidal shape is neglected is plane surveying.

18. Type of surveying in which the shape of the earth taken into account is _____
a) Topographic Surveying
b) Hydrographic Surveying
c) Geodetic Surveying
d) Plane Surveying
Answer: c
Explanation: Type of surveying in which the shape of the earth taken into account is geodetic surveying. The 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.

19. Horizontal projection of an area and shows only horizontal distances of the points is _____
a) Contour lines
b) Levelling
c) Surveying
d) Plan
Answer: d
Explanation: Horizontal projection of an area and shows only horizontal distances of the points is plan or map. Finding the elevations of a point with respect to a given or assumed and establish points given elevation or at different elevations with respect to given or assumed dactum is levelling.

20. What type of surveys needs to fix the boundaries of municipalities and of state and federal jurisdictions?
a) Topographic Surveying
b) Hydrographic Surveying
c) Cadastral Surveying
d) City Surveying

Answer: c
Explanation: The surveys need to fix the boundaries of municipalities and of state and federal jurisdictions are cadastral surveying. 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.

21. Determining the absolute location of any point or the absolute location and direction of any line on the surface of the earth is called _____
a) Topographic Surveying
b) Astronomical Surveying
c) Cadastral Surveying
d) Hydrographic Surveying
Answer: b
Explanation: Determining the absolute location of any point or the absolute location and direction of any line on the surface of the earth is astronomical surveying.

22. Determining different strata in the earth's crust is called as_____
a) Mine Survey
b) Geological Survey
c) Geodetic Survey
d) Archaeological Survey
Answer: b
Explanation: Determining different strata in the earth's crust is the Geological Survey. Type of surveying in which the shape of the earth taken into account is geodetic surveying.

23. Determining unearthing relics of antiquity is called as_____
a) Mine Survey
b) Geological Survey
c) Geodetic Survey
d) Archaeological Survey
Answer: d
Explanation: Determining the unearthing relics of antiquity is an archaeological survey. Determining different strata in the earth's crust is the geological survey.

24. In which surveying, shape of earth is taken into consideration?
a) Plane surveying
b) Geodic surveying
c) Topographic surveying
d) Geological surveying
Answer: b
Explanation: In Geodic surveying, shape of the earth is considered for carrying out high precise work. In case of Plane surveying, spheroid shape is neglected and entire area is considered in the form of triangles. Topographic surveying consists of vertical and horizontal locations of points whereas Geological surveying determines earth's strata.

25. Representing large scale on the surface of the earth is_____
a) Plan
b) Map
c) Scale
d) Area
Answer: a
Explanation: For any representation, if it consists large scale then it represents plan and for small scale it represents map.

26. Which of the following units measurement system is generally employed?
a) Centesimal system
b) Hours system
c) Minutes system
d) Sexagesimal system
Answer: d
Explanation: Since most surveying instruments are graduated according to this system, Sexagesimal system is widely used in India. Centesimal system is having a great approach in Europe for its adaptability in interpolation. Hours system is having its use in navigation.

27. The ratio of map distance to corresponding ground distance is called as_____
a) Representative factor
b) Representation factor
c) Reciprocating factor
d) Recurring factor
Answer: a
Explanation: This factor can be used for determining the ratio of map distance to ground distance which would be helpful for further calculations.

28. Which among the following methods is used for determining the precise position on the earth surface?
a) Geological surveying
b) Geodic surveying
c) Land surveying
d) Plane Surveying
Answer: b
Explanation: In Geodic surveying, spheroid surface of the earth is considered which might be possible for determining the precise position by avoiding any further assumptions.

29. Which among the following is one of the principles of surveying?
a) Taking measurements
b) Covering entire area
c) Determining the elevation differences
d) Working from whole to part
Answer: d
Explanation: By working from whole to part, it is possible to eliminate the errors and to localise the errors. Otherwise, it might expand in magnitude.

30. Design a vernier for a theodolite circle divided into degrees and one fourth degrees to read to 20".
a) 55
b) 45
c) 65
d) 35
Answer: b
Explanation: W.K.T, L.C = s/n
S = (1/4)˚= 15' and L.C=20"=20/60 min.
So, 20/60 = 15/n
n = 45.

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02 – Chain and cross staff Survey	Marks:-08

Content of Chapter:-

2.1 Chain survey Instruments: Metric Chain, Tapes, Arrow, Ranging_ rod,Open cross staff.Optical square(No questions to be asked for exams)
2.2 Chain survey Station, Base line, Checkline, Tie line, Offset, Tie station, obstacles in chaining; Types of offsets: Perpendicular and Oblique
2.3 Ranging: Direct and Indirect Ranging,(No questions to be asked for exams)
2.4 Errors in length: Instrumental error,personal error, error due to natural cause, random error
2.5 Principle of triangulation
2.6 Location Sketch of survey station and running measurements of building.
2.7 Conventional Signs, Recording of measurements in a field book.
2.8 Area Calculations (Numerical problems)

1. Process of fixing or establishing intermediate points is known as _____
a) Chaining
b) Ranging
c) Contouring
d) Levelling
Answer: b
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.

2. Direct ranging is done when the two ends of the survey lines are _____
a) Invisible
b) Intervisible
c) Visible from a particular point
d) Faraway from each other
Answer: b
Explanation: Direct ranging is the type of ranging in which the two points for ranging are chosen in such a way that they are intervisible. If two points chosen are not intervisible then indirect ranging is done.

3. If rapid sweep with right hand signaled by surveyor then action by the assistant is _____
a) Move slowly to the right
b) Move considerably to the right
c) Continue to move to the right
d) Plumb the rod to the right
Answer: b
Explanation: Rapid sweep by the surveyor implies move considerably. Right hand of the surveyor implies that the assistant has to move right side.

4. If right hand extended by surveyor then action by the assistant should be _____
a) Move slowly to the right
b) Move considerably to the right
c) Continue to move to the right
d) Plumb the rod to the right
Answer: c
Explanation: Extended hand of the surveyor implies that the assistant should continue to move. Right hand of the surveyor implies that the assistant has to move right side.

5. Right arm up and moved to the right by the surveyor then the action of assistant should be _____
a) Move slowly to the right
b) Move considerably to the right
c) Continue to move to the right
d) Plumb the rod to the right
Answer: d
Explanation: Arm up and moved by the surveyor implies that the assistant has to plumb the rod. Right hand of the surveyor implies that assistant has to move right side.

6. If both hands above head and then brought down by the surveyor then the action of an assistant is _____
a) Move slowly forward
b) Move considerably backward
c) Correct
d) Wrong
Answer: b
Explanation: It is the signal referred by the surveyor to correct the assistant position. If both hands above head and then brought down by the surveyor then assistant should move considerably backward.

7. The more experienced of the chainmen should be _____
a) Rear end
b) Intermediate end
c) Final end
d) Leader
Answer: a
Explanation: Other chainmen holding the forward handle is known as the leader. More experienced chainmen mainly refer to the surveyor. He should always preferred to be at a rear end.

8. The chainmen keeps both the handles in the right hand and throws the rest of the portion of the chain in the forward direction with his right hand to _____
a) Mark the chain
b) Line the chain
c) Unfold the chain
d) Fold the chain
Answer: c
Explanation: To Unfold the chain, the chainmen keeps both the handles in the right hand and throws the rest of the portion of the chain in the forward direction with his right hand. The other assists in removing the knots etc and in making the chain straight.

9. If rapid sweep with left hand by surveyor then action by assistant is _____
a) Move slowly to the left
b) Move considerably to the left
c) Continue to move to the left
d) Plumb the rod to the left
Answer: b
Explanation: Rapid sweep by the surveyor implies that assistant should move considerably. Left hand of the surveyor implies that assistant has to move left side.

10. If left hand is extended by surveyor then action by the assistant should be _____
a) Move slowly to the left
b) Move considerably to the left
c) Continue to move to the left
d) Plumb the rod to the left
Answer: c
Explanation: Extended hand of the surveyor implies that the assistant should continue to move. Left hand of the surveyor implies that the assistant has to move left side.

11. Left arm up and moved to the left by the surveyor then action of assistant should be _____
a) Move slowly to the left
b) Move considerably to the left
c) Continue to move to the left
d) Plumb the rod to the left
Answer: d
Explanation: Arm up and moved by the surveyor implies that the assistant has to plumb the rod. Left hand of the surveyor implies that the assistant has to move left side.

12. Slow sweep with the left hand is signal by a surveyor, action by the assistant is _____
a) Move slowly to the left
b) Move considerably to the left
c) Continue to move to the left
d) Plumb the rod to the left
Answer: a
Explanation: Slow sweep by the surveyor implies that an assistant has to move slowly. Left hand of the surveyor implies the assistant has to move left side.

13. Slow sweep with the right hand is signal by a surveyor, action by the assistant is _____

a) Move slowly to the right
b) Move considerably to the right
c) Continue to move to the right
d) Plumb the rod to the right
Answer: a
Explanation: Slow sweep by the surveyor implies that an assistant has to move slowly. Right hand of the surveyor implies an assistant has to move right side.

14. Both arms extended forward horizontally and the hands depressed briskly is the signal by surveyor then the action of the assistant should be _____
a) Move slowly forward
b) Fix the rod
c) Correct
d) Wrong
Answer: b
Explanation: Both arms extended forward horizontally and the hands depressed briskly by the surveyor imply assistant has to fix the rod. These instructions or gestures are standard ways prescribed as per Indian standards.

15. What type of ranging is done if both ends of surveying lines are visible?
a) Direct
b) Indirect
c) Reciprocal
d) Unable to do
Answer: a
Explanation: Direct ranging is done if both ends of surveying lines are visible. Indirect ranging is done when both ends are not intervisible.

16. What has resorted to when both the ends of the survey line are not intervisible?
a) Direct
b) Indirect
c) Irreciprocal
d) Unable to do
Answer: b
Explanation: Reciprocal ranging is also called indirect ranging. Indirect ranging is done when both ends are not visible.

17. Degree of accuracy for Invar tape, spring balance is _____
a) 1 in 100
b) 1 in 1000
c) 1 in 10,000
d) 1 in 10
Answer: c
Explanation: In the case of Invar tape there is an error of 1 unit in the measured distance of 10,000. It may slightly vary or decrease over a period of time.

18. Degree of accuracy for steel tape, Plumb bob is _____
a) 1 in 100
b) 1 in 1000
c) 1 in 10,000
d) 1 in 10
Answer: b
Explanation: In the case of steel tape there is an error of 1 unit in the measured distance of 1000. Invar tape is 10 times more accurate than steel tape.

19. Degree of accuracy for tested chain is _____
a) 1 in 100
b) 1 in 1000
c) 1 in 10,000
d) 1 in 10
Answer: b
Explanation: In the case of a tested chain there is an error of 1 unit in the measured distance of 1000. It is the same as the Invar tape.

20. Degree of accuracy for chain under the average condition is _____
a) 1 in 500
b) 1 in 50,000
c) 1 in 5000
d) 1 in 50
Answer: a
Explanation: In case of the tested chain there is an error of 1 unit in the measured distance of 1000 units. In case of chain in average conditions there is an error of 1 unit in the measured distance of 500 units.

21. Degree of accuracy for a chain on rough or hilly ground is _____
a) 1 in 500
b) 1 in 2500
c) 1 in 350
d) 1 in 250
Answer: d
Explanation: In case of chain on the rough or hilly ground there is an error of 1 unit in the measured distance of 250. Degree of accuracy for chain decreases for chain on rough or hills areas when compared to smooth or plane surface ground due to the increase in number of irregular slopes.

22. 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
Answer: b
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 × (20.1/20)=251.25 m.

23. The length of a survey line was measured with a 20 m chain and was found to be equal to 1200 m. If the length again measured with 25 m chain it is 1212 m. On comparing the 20 m chain with the test gauge, it was found to be 1 decimeter too long. Find the actual length of 25 m chain used.
a) 22.25 m
b) 21.64 m
c) 24.25 m
d) 24. 88 m
Answer: d
Explanation: Incorrect length of 20 m line is 20+0.10 = 20.10 m. True length of line = 1200×(20.10/20) = 1206 m. Actual or True length of 25 m chain = (1206×25)/1212 = 24.88 m.

25. 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
Answer: b
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 × 40 = 936 m.

26. If L is true length of chain and L' is incorrect length of the chain the correction to area A is _____
(Where ∆L/L = e, e is small and A' is measured area)
a) 1+2e A'
b) (1+2e)/A'
c) (1+2e) x A'
d) (1+ e)xA'
Answer: c
Explanation: By using $A=A'(L'/L)^2$ and $L'/L=(L+\Delta L)/L=1+e$ where $e = \Delta L/L$.

27. If L is true length of chain and L' is incorrect length of the chain the correction to Volume V is _____
(Where ∆L/L = e, e is small and V' is measured area)
a) 1+3e)+ V'
b) (1+3e)/V'
c) (1+3e)xV'
d) (1+ e) ×V'
Answer: c
Explanation: By using $V = V'(L'/L)^3$, $e = \Delta L/L$ and $L'/L = (L+\Delta L)/L = 1+e$. Then $V = V' (1+e)^3$ here e is small so V = (1+3e)xV'.

28. The difference between a measurement and the true value of the quantity measured is _____
a) True error
b) Discrepancy
c) Limit of error
d) Accuracy
Answer: a
Explanation: The difference between a measurement and the true value of the quantity measured is the true error of the measurement. The important function of a surveyor is to secure measurements that are correct within a certain limit of error prescribed by the nature and purpose of a particular survey.

29. The difference between the two measured values of the same quantity is _____
a) Precision
b) Accuracy
c) Discrepancy
d) Error
Answer: c
Explanation: A discrepancy is a difference between two measured values of the same quantity. A discrepancy may be small, yet the error may be great if each of the two measurements contains an error that may be large.

30. Which of the following are not sources of errors?
a) Instrumental
b) Personal
c) Natural
d) Artificial
Answer: d
Explanation: Error may arise from three sources namely instrumental, personal and natural.

31. A tape may be too long or an angle measuring instrument may be out of adjustment. Then such type of error comes under which source of error?
a) Instrumental
b) Personal
c) Natural
d) Artificial
Answer: a
Explanation: Error may arise due to imperfection or faulty adjustment of the instrument with which measurement is being taken comes under an instrumental source of error.

32. Investigation of observations of various types shows that accidental errors follow a definite law. This law is called _____
a) Law of probability
b) Law of recurrence
c) Law of precise
d) Law of accuracy
Answer: a
Explanation: This law defines the occurrence of errors and can be expressed in the form of the equation which is used to compute the probable value or the probable precision of a quantity. This is also termed as a theory of probability.

33. A line which joins subsidiary stations on the main line is called _____
a) Tie line
b) Survey lines
c) Base lines
d) Check lines
Answer: a
Explanation: Check lines or proof lines are the lines which are run in the field to check the accuracy of the work. A Tie line is a line which joins subsidiary or tie stations on the main line.

34. In which type of surveying only linear measurements are made?
a) Contouring
b) Chain surveying
c) Theodolite surveying
d) Dumpy level
Answer: b
Explanation: Chain surveying is the type of surveying in which only linear measurements are made in the field. This type of surveying is suitable for surveys of small extent on open take simple details.

35. A survey station is prominent on the chain line and can be either at the beginning of the chain or at the end. Such stations are known as _____
a) Main station
b) Tie station
c) Subsidiary station
d) Intermediate station
Answer: a
Explanation: However, subsidiary or tie station can also be selected anywhere on the chain line and subsidiary or tie lines may be run through them. A survey station is prominent on the chain line and can be either at the beginning of the chain or at the end. Such stations are known as the main station.

36. What is laid by joining the apex of the triangle to any point on the opposite side or by joining two points on any two sides of a triangle?
a) Check line
b) Base line
c) Tie line
d) Survey line
Answer: a
Explanation: Check line is laid by joining the apex of the triangle to any point on the opposite side or by joining two points on any two sides of a triangle. Each triangle must have a check line.

37. 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
Answer: a
Explanation: Tie line is a line which joins subsidiary or tie stations on the main line. The accuracy in the location of the objects depends upon the accuracy in laying the tie line.

38. Survey stations must be mutually visible to obtain a good system of line.
a) True
b) False
Answer: a
Explanation: Surveyor and assistant must be visible to each other. So, survey stations must be mutually visible.

39. In case, to get a well-proportioned or well-shaped triangle, no angle should be less than _____
a) 15°
b) 30°
c) 45°
d) 25°
Answer: b
Explanation: If it is less than 30° then the chance of error increases in triangulation
.
40. Each triangle or portion of a skeleton must be provided with sufficient tie lines to obtain good system of lines.
a) True
b) False
Answer: b
Explanation: Each triangle or portion of a skeleton must be provided with sufficient check lines to obtain good system of lines.

41. As far as possible, the main survey line should not pass through _____
a) Road
b) Check line
c) Obstacles
d) Tie line
Answer: c
Explanation: Always to obtain a good system of survey lines, main survey line should not pass through obstacles. It can pass through road if necessary.

42. Check lines should form well-conditioned triangles to obtain a good system of survey lines.
a) True
b) False
Answer: b
Explanation: Main lines should form well-conditioned triangles to obtain a good system of survey lines. Each triangle or portion must be provided with sufficient check lines.

43. The simplest instrument used for setting right angles is a _____
a) Cross staff
b) Optical square
c) Prism square
d) Site square
Answer: a
Explanation: The simplest instrument used for setting out the right angles is a cross staff. It consists of either a frame or box with pairs of vertical slits and is mounted on a pole shod for fixing in the ground.

44. Which of the following is not a common form of cross staff?
a) Open cross staff
b) French cross staff
c) Adjustable cross staff
d) German cross staff
Answer: d
Explanation: The common forms of cross staff are open cross staff, french cross staff, adjustable cross staff.

45. Which cross staff consists of two cylinders of equal diameter placed one on top of the other?
a) Open cross staff
b) French cross staff
c) Adjustable cross staff
d) Optical square
Answer: c
Explanation: Adjustable cross staff consists of two cylinders of equal diameter placed one on top of the other. Both are provided with sighting sits. The upper box carries a vernier and can be rotated relatively to lower by a circular rack.

46. Prism square works on the same principle as that of _____
a) Cross staff
b) Open cross staff
c) Optical square
d) Site square
Answer: c
Explanation: It is a modern and precise instrument and is used in a similar manner as that of optical square. It has a merit that no adjustment is required since the angle between the reflecting surfaces cannot vary.

47. 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
Answer: b
Explanation: Wooden pegs are used to mark the positions of the stations or terminal points of survey line. They are made of stout timber.

48. Which cross staff consists of two pairs of vertical slits giving two lines of sights at right angles to each other?
a) Open cross staff
b) French cross staff
c) Adjustable cross staff
d) In all types
Answer: a
Explanation: Open cross staff is provided with two pairs of vertical slits giving two lines of sights at right angles to each other.

49. Which cross staff consists of a hollow octagonal box?
a) Open cross staff
b) French cross staff
c) Adjustable cross staff
d) Optical square
Answer: b
Explanation: Adjustable cross staff consists of two cylinders of equal diameter placed one on top of the other. Both are provided with sighting sits. French cross staff consists of a hollow octagonal box.

50. How many number of arrows are required for chain surveying?
a) 10
b) 5
c) 15
d) 20
Answer: a
Explanation: These are among the list of equipment required for chain surveying they are 20 m chain, 10 arrows, ranging rods and offset rods, plumb bob etc.

51. What are used after every chain length measured on the ground?
a) Pegs
b) Ranging rods
c) Arrows
d) Offset rods
Answer: c
Explanation: An arrow is inserted into the ground after every chain length measured on the ground. Wooden Pegs or pegs and offset rods are the survey instruments used in the chaining process in surveying.

52. What can be used in conjunction with a datum rod into the base of the instrument?
a) Cross staff
b) Open cross staff
c) Optical square
d) Site square
Answer: d
Explanation: A site square designed for setting out straight lines and offset lines at 90 degrees. It can be used in conjunction with a datum rod into the base of the instrument.

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03 – Tacheometry	Marks:-16

Content of Chapter:-

3.1 Compass Traversing: open, closed

3.2 Technical Terms: Geographic/True Magnetic and Arbitrary Meridians and Bearings, Meridian and Bearing, Whole Circle Bearing System (Azimuth) and Reduced (Quadrantal) Bearing System and examples on conversion of givenbearing to another bearing (from one form to another), Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station. Dip of Magnetic needle. Magnetic Declination.(Numerical problems)

1. In chain and compass traversing, the magnetic bearings of the survey lines are measured by a _____

a) chain
b) compass
c) theodolite
d) dumpy level

Answer: b
Explanation: In chain and compass traversing, the magnetic bearings of the survey lines are measured by a compass and the lengths of the lines are measured either with a chain or with a tape.

2. How many methods of observing the bearings of lines by fast needle method?

a) 2
b) 3
c) 4
d) 5

Answer: b
Explanation: There are three methods of observing the bearings of lines by fast needle method. They are a direct method with transiting, direct method without transiting and back bearing method.

3. Compass surveying is recommended when the area is _____

a) Large, even and crowded with many details
b) Small, undulating and not details are crowded
c) Large, undulating and crowded with many details
d) Small, even and crowded with many details

Answer: c
Explanation: Compass surveying is recommended when the area is large, undulating and crowded with many details. It is not recommended for areas where the local attraction is suspected due to the presence of a magnetic substance.

4. In which areas does compass surveying is not recommended?
a) Local attraction suspected areas
b) Large areas
c) Undulating areas
d) Crowded with many details
Answer: a
Explanation: Compass surveying is not recommended for areas where the local attraction is suspected due to the presence of a magnetic substance.

5. Which of the following presence is not affected for compass surveying?
a) Steel structures
b) Wooden structures
c) Iron ore deposits
d) Electric cables conveying currents
Answer: b
Explanation: Compass surveying is not recommended for areas where the local attraction is suspected due to the presence of magnetic substance like steel structures, iron ore de, electric cables conveying currents.

6. Which of the following term used to denote any influence which prevents the needle from pointing to the north in a given locality?
a) Magnetic bearing
b) Compass deflection
c) Local attraction
d) Magnetic declination
Answer: c
Explanation: Local attraction is the term used to denote any influence which prevents the needle from pointing to the north in a given locality.

7. Which of the following is not required in compass surveying?
a) Bearing angles
b) Lengths of lines
c) Triangles
d) Connecting lines
Answer: c
Explanation: The principle of compass surveying is traversing which involves a connection of series of lines. Magnetic bearings are measured by compass and lengths are measured by a chain.

8. In Compass traversing length of lines are measured by _____
a) Chain
b) Compass
c) Theodolite
d) Dumpy level
Answer: a
Explanation: In Compass traversing, the lengths of lines are measured by a chain and magnetic bearings are measured by compass.

9. Fast needle method is more accurate than the loose needle method.
a) True
b) False
Answer: a
Explanation: In loose needle, method lengths are measured with the chains. In fast needle, method lengths are measured with the 20 or 30 m tapes.

10. Prismatic compass is an instrument for measuring angles.
a) True
b) False
Answer: b
Explanation: Prismatic compass is an instrument used for the direct measurement of direction. Instruments for measurement of angles are sextant and theodolite.

11. Which of the following is the most convenient and portable instrument for direct measurement of directions?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: Prismatic compass is the most convenient and portable form of a magnetic compass which can either be used as a hand instrument or can be fitted on a tripod.

12. Which of the following is not a part of the prismatic compass?
a) Agate cap
b) Prism cap
c) Brake pin
d) Jewel bearing
Answer: d
Explanation: Prism cap, prism, brake pin, spring brake, pivot, agate cap etc are parts of the prismatic compass. Jewel bearing is one of the parts of surveyor's compass.

13. In prismatic compass needle is of edge bar type.
a) True
b) False
Answer: b
Explanation: The needle is of broad needle type and the needle doesn't act as an index in case of a prismatic compass. Edge bar type of needle is in surveyor's compass.

14. In which of the following compass needle does not act as an index?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: In the case of prismatic compass needle does not act as an index. In the case of surveyors, compass needle acts as an index.

15. In which of the following compass graduated card ring is attached with the needle?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: The graduated card ring is attached with the needle in case of a prismatic compass. In the case of surveyor's compass, the graduated card is attached to the box and not to the needle.

16. Which of the following instruments can be used without a tripod?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: Prismatic compass is the most convenient and portable form of a magnetic compass which can either be used as a hand instrument or can be fitted on a tripod.

17. In prismatic compass, graduations are in W.C.B system.
a) True
b) False
Answer: a
Explanation: In prismatic compass, graduations are in W.C.B system, having 0° to south end, 90° at west, 180° at north and 270° at east. The graduations are engraved inverted.

18. In which of the following compass graduations are engraved inverted?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: In case of prismatic compass graduations are engraved inverted. In case of surveyor's compass graduations are engraved erect.

19. In which of the following compass sighting and reading taking can be done simultaneously from one position of the observer?
a) Prismatic compass
b) Surveyor's compass
c) Theodolite
d) Sextant
Answer: a
Explanation: In case of a prismatic compass, reading is taken with the help of prism provided at the eye slit. Sighting and reading taking can be done simultaneously from one position of the observer.

20. The direction of a survey line can either be established with relation to _____
a) each other
b) main station
c) arrows
d) tie station
Answer: a
Explanation: The direction of a survey line can either be established in relation to each other or with relation to any meridian.

21. What is the direction of line relative to a given meridian?
a) Bearing of a line
b) Length of a line
c) Slope of a line
d) Reciprocal of slope of a line
Answer: a
Explanation: Bearing of a line is the direction of line relative to a given meridian. A meridian is any direction such as true meridian, magnetic meridian, arbitrary meridian.

22. Which line passes through true north and true south?
a) True Meridian
b) Magnetic Meridian
c) Arbitrary Meridian
d) Dip
Answer: a
Explanation: True Meridian through a point is the line in which a plane passing that point and the north and the south poles, intersects with the surface of the earth. It, thus, passes through the true north and south.

23. Which meridian direction can be established with the help of a magnetic compass?
a) True Meridian
b) Magnetic Meridian
c) Arbitrary Meridian
d) All meridians
Answer: b
Explanation: Magnetic meridian through a point in the direction shown by a freely floating and balanced magnetic needle free from all other attractive forces. The direction of magnetic meridian can be established with the help of a magnetic compass.

24. Which meridians are used to determine the relative positions of the lines in a small area?
a) True Meridian
b) Magnetic Meridian
c) Arbitrary Meridian
d) All meridians
Answer: c
Explanation: Arbitrary Meridian is any convenient direction towards a permanent and prominent mark or signal, such as a church spire etc. Such meridians are used to determine the relative positions of the lines in a small area.

25. 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
Answer: a
Explanation: True bearing is the horizontal angle which it makes with the true meridian through one of the extremities of the line. True Meridian through a point is the line in which a plane passing that point and the north and the south poles, intersects with the surface of the earth.

26. What is the horizontal angle which it makes with the magnetic meridian through one of the extremities of the line?
a) True bearing
b) Magnetic bearing
c) Arbitrary bearing
d) Dip
Answer: b
Explanation: Magnetic bearing is the horizontal angle which it makes with the magnetic meridian through one of the extremities of the line. The direction of magnetic meridian can be established with **the help of a magnetic compass.**

27. What is the horizontal angle which it makes with the magnetic meridian through one of the extremities of the line?
a) True bearing
b) Magnetic bearing
c) Arbitrary bearing
d) Dip
Answer: c
Explanation: Arbitrary bearing is the horizontal angle which it makes with the arbitrary meridian through one of the extremities of the line. Arbitrary meridians are used to determine the relative positions of the lines in a small area.

28. Convert 22°30′ whole circle bearings to quadrant bearings?
a) 180 – 22°30
b) 22°30
c) 360 – 22°30
d) 270 – 22°30
Answer: b
Explanation: Reduced bearing = Whole circle bearing if R.B is less than 90°. Therefore here R.B = W.C.B = N 22°30'E.

29. Convert 122°30′ whole circle bearings to quadrant bearings?
a) 180 – 122°30
b) 122°30
c) 360 – 122°30
d) 270 – 122°30
Answer: a
Explanation: Reduced bearing = 180 – Whole circle bearing if R.B is lies between 90° and 180°. Therefore here R.B = W.C.B = N 22°30'E.

30. Which of the following is not among the classification of errors in compass surveying?
a) Instrumental errors
b) Personal errors
c) Errors due to the natural cause
d) Surveyor errors
Answer: d
Explanation: The errors may be classified as instrumental errors, personal errors, errors due to natural causes. Surveyor errors may come under personal errors
.
31. Which of the following is not under instrumental errors?
a) Sluggish needle
b) Blunt pivot joint
c) Inaccurate centring
d) Plane of sight not being vertical
Answer: c
Explanation: Instrumental errors are those which arise due to the faulty adjustment of the instruments. They may be due to the following reasons the needle not being perfectly straight, sluggish needle etc.

32. Line of sight not passing through the centres of the right comes under personal errors.
a) True
b) False
Answer: b
Explanation: Line of sight not passing through the centres of the right comes under instrumental errors. Instrumental errors are those which arise due to the faulty adjustment of the instruments.

33. Which of the following error comes under personal errors?
a) The needle not being perfectly straight
b) Pivot being bent
c) Plane of sight not being vertical
d) Inaccurate bisection of signals
Answer: d
Explanation: Instrumental errors are those which arise due to the faulty adjustment of the instrument e.g the needle not being perfectly straight, sluggish needle etc. Inaccurate centring, Inaccurate levelling of compass box, Inaccurate bisection of signals etc comes under personal errors.

34. Inaccurate levelling of the compass box is a personal error in compass surveying.
a) True
b) False
Answer: a
Explanation: Inaccurate centring, Inaccurate levelling of compass box, Inaccurate bisection of signals etc comes under personal errors. Careless in reading and recording also.

35. Local attraction due to the proximity of local attraction forces comes under instrumental errors.
a) True
b) False
Answer: b
Explanation: Local attraction due to the proximity of local attraction forces comes under natural errors. Variation in declination, magnetic changes in the atmosphere due to clouds and Strom's etc also comes under natural errors in compass surveying.

36. Which of the following is not a natural error in compass surveying?
a) Variation in declination
b) Magnetic changes in the atmosphere due to clouds and Strom's
c) Local attraction due to the proximity of local attraction forces
d) Pivot being bent
Answer: d
Explanation: Instrumental errors are those which arise due to the faulty adjustment of the instrument e.g pivot being bent, blunt pivot point etc. Variation in declination, magnetic changes in the atmosphere due to clouds and Strom's etc also comes under natural errors in compass surveying.

37. Variation in declination is a natural error in compass surveying.
a) True
b) False
Answer: a
Explanation: Natural errors are those which are not in over hands or control to adjust. Variation in declination, magnetic changes in the atmosphere due to clouds and Strom's etc also comes under natural errors in compass surveying.

38. Improper balancing weight comes under instrumental errors in compass surveying.
a) True
b) False
Answer: a
Explanation: Instrumental errors are those which arise due to the faulty adjustment of the instrument e.g pivot being bent, blunt pivot point etc.

39. Irregular variation due to magnetic storms is a _____ error.
a) Instrumental errors
b) Personal errors
c) Errors due to the natural cause
d) Surveyor errors
Answer: c
Explanation: Natural errors are those which are not in over hands or control to adjust. Variation in declination, magnetic changes in the atmosphere due to clouds and Strom's etc are some of the examples of natural causes.

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04 – Levelling	Marks:-24

Content of Chapter:-

4.1 Terminologies: Level surfaces, level line; Horizontal and vertical surfaces, Datum Bench Marks- GTS, Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight. intermediate sight, Change point, Height of instruments,

4.2 Types of levels: Dumpy, Tilting, Auto level, Digital level, Components of Dumpy Level and its fundamental axes. Temporary adjustments of Level.

4.3 Types of Leveling Staffs: Self-reading staff and Target staff

4.4 Reduction of level by Line of collimation method and Rise/ Fall Method

4.5 Methods: To find the R. L. by H.I. method(Numerical problems)

4.6 To find R.L by Rise and Fall method with necessary checks. (Numerical problems)

4.7 Leveling Types: Simple, Differential, Fly, Profile and Reciprocal Leveling

4.8 Computation of missing readings, Errors in Leveling. (Numerical problems)

4.9 Comparison of different levels

1. Which branch of surveying is used to find the elevations of given points with respect to given or assumed datum?
a) Levelling
b) Contouring
c) Traversing
d) Plane table surveying
Answer: a
Explanation: Levelling is a branch of surveying is used to find the elevations of given points with respect to given or assumed datum.

2. Levelling is a branch of surveying objects of which is to establish points at a given elevation or at different elevations with respect to given or assumed datum.
a) True
b) False
Answer: a
Explanation: The first operation is required to enable the works to be designed while the second operation is required in the setting out of all kinds of engineering works.

3. Levelling deals with measurements in a _____
a) Horizontal plane
b) Inclined plane
c) Vertical plane
d) Both vertical and horizontal plane
Answer: c
Explanation: Levelling is a branch of surveying objects of which is to establish points at a given elevation or at different elevations with respect to given or assumed datum. It deals with measurements in a vertical plane.

4. _____ 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
Answer: a
Explanation: The surface of still water is a truly level surface. Any surface parallel to the mean spheroidal surface of the earth is, therefore, a level surface.

5. _____ is a line lying in a level surface.
a) Level line
b) Horizontal line
c) Datum line
d) Plumb line
Answer: a
Explanation: A level line is a line lying in a level surface. It is, therefore, normal to the plumb line, at all points.

6. Horizontal plane through a point is a plane tangential to the level surface at that point.
a) True
b) False
Answer: a
Explanation: Horizontal plane through a point is a plane tangential to the level surface at that point. It is, therefore, perpendicular to the plumb line through the point.

7. Which line is the tangential to the level line at a point?
a) Datum line
b) Vertical line
c) Horizontal line
d) Plumb line
Answer: c
Explanation: It is straight line tangential to the level line at a point. It is also perpendicular to the plumb line.

8. Which line is normal to the level line at a point?
a) Datum line
b) Vertical line
c) Horizontal line
d) Plumb line
Answer: b
Explanation: Vertical line is a line normal to the level line at a point. It is commonly considered to be the line defined by a plumb line.

9. Which term is used for the surface to which elevations are referred?
a) Level surface
b) Level line
c) Horizontal plane
d) Datum
Answer: d
Explanation: Datum is any surface to which elevations are referred. The mean sea level affords a convenient datum world over.

10. The elevations of points or near the surface of the earth is its vertical distance above or below an arbitrary assumed level surface or datum.
a) True
b) False
Answer: a
Explanation: The difference in elevation between two points in the vertical distance between the two level surface in which the two points lie. Elevation simply can say vertical distance.

11. Which of the following is not a method of levelling?
a) Barometric levelling
b) Trigonometric levelling
c) Spirit levelling
d) Traverse levelling
Answer: d
Explanation: Three principal methods are used for determining a difference in elevation, namely, barometric levelling, trigonometric levelling and spirit levelling. Traversing is that type of surveying in which a number of connected survey lines form the framework.

12. Which of the following methods of levelling makes use of the phenomenon that difference in elevation between two points is proportional to the difference in atmospheric pressures at these points?
a) Barometric levelling
b) Trigonometric levelling
c) Spirit levelling
d) Traverse levelling
Answer: a
Explanation: A barometric levelling makes use of the phenomenon that difference in elevation between two points is proportional to the difference in atmospheric pressures at these points. A barometer, therefore, may be used and the readings observed at different points would yield a measure of the relative elevations of those points.

13. At a given point, the atmospheric pressure doesn’t remain constant in the course of the day, even in the course of an hour.
a) True
b) False
Answer: a
Explanation: At a given point, the atmospheric pressure doesn’t remain constant in the course of the day, even in the course of an hour. Therefore, barometric levelling relatively inaccurate.

14. 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
Answer: b
Explanation: Trigonometric levelling is also called indirect levelling. It is the process of levelling in which the elevations of points are computed from the vertical angles and horizontal distances measured in the field.

15. Which of the following methods of levelling is a modified form of stadia levelling?
a) Barometric levelling
b) Trigonometric levelling
c) Spirit levelling
d) Traversing
Answer: b
Explanation: Trigonometric levelling is the process of levelling in which any triangle can be computed from proper trigonometric relations. In a modified form called stadia levelling.

16. Which branch of surveying is used to find the elevations of given points with respect to given or assumed datum?
a) Levelling
b) Contouring
c) Traversing
d) Plane table surveying
Answer: a
Explanation: Levelling is a branch of surveying is used to find the elevations of given points with respect to given or assumed datum.

17. Levelling is a branch of surveying objects of which is to establish points at a given elevation or at different elevations with respect to given or assumed datum.
a) True
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Explanation: The first operation is required to enable the works to be designed while the second operation is required in the setting out of all kinds of engineering works.

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19. _____ 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
Answer: a
Explanation: The surface of still water is a truly level surface. Any surface parallel to the mean spheroidal surface of the earth is, therefore, a level surface.

20. _____ is a line lying in a level surface.
a) Level line
b) Horizontal line
c) Datum line
d) Plumb line
Answer: a
Explanation: A level line is a line lying in a level surface. It is, therefore, normal to the plumb line, at all points.

21. Horizontal plane through a point is a plane tangential to the level surface at that point.
a) True
b) False
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Explanation: Horizontal plane through a point is a plane tangential to the level surface at that point. It is, therefore, perpendicular to the plumb line through the point.

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Explanation: Vertical line is a line normal to the level line at a point. It is commonly considered to be the line defined by a plumb line.

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Explanation: Trigonometric levelling is also called indirect levelling. It is the process of levelling in which the elevations of points are computed from the vertical angles and horizontal distances measured in the field.

30. Which of the following methods of levelling is a modified form of stadia levelling?
a) Barometric levelling
b) Trigonometric levelling
c) Spirit levelling
d) Traversing
Answer: b
Explanation: Trigonometric levelling is the process of levelling in which any triangle can be computed from proper trigonometric relations. In a modified form called stadia levelling.

3**1. Which of the following is not an instrumental error?**
a) error due to imperfect adjustment
b) error due to sluggish bubble
c) error due to movement of objective slide
d) settlement of tripod or turning points
Answer: d
Explanation: Error due to imperfect adjustment, error due to sluggish bubble, error due to movement of the objective slide are instrumental errors. Settlement of tripod or turning points is a natural error.

32. Which of the following is a natural error?
a) error due to defective joint
b) rod not of standard length
c) variations in temperature
d) error due to sluggish bubble
Answer: c
Explanation: Error due to a defective joint, rod not of standard length, error due to sluggish bubble are instrumental errors. Variations in temperature are a natural error.

33. Which of the following is a personal error?
a) mistakes in manipulation
b) atmospheric refraction
c) settlement of tripod or turning points
d) wind vibrations
Answer: a
Explanation: Atmospheric refraction, settlement of tripod or turning points, wind vibrations are natural errors. Mistakes in manipulation is a personal error.

34. Which of the following is not a personal error?
a) mistake in rod handling
b) errors in sighting
c) mistake in reading the rod
d) error due to defective joint
Answer: d
Explanation: Mistake in rod handling, errors in sighting, a mistake in reading the rod are personal errors. Error due to the defective joint is an instrumental error.

35. Atmospheric refraction is _____
a) instrumental error
b) natural error
c) personal error
d) it’s not an error
Answer: b
Explanation: Atmospheric refraction is a natural error. Settlement of tripod or turning points, wind vibrations are also natural errors.

36. Which of the following is an instrumental error?
a) earth's curvature
b) mistake in rod handling
c) mistakes in recording
d) error due to sluggish bubble
Answer: d
Explanation: Earth's curvature is a natural error. Mistake in rod handling, mistakes in recording are personal errors. Error due to sluggish bubble is an instrumental error
.
37. Which of the following is not a natural error?
a) error due to defective joint
b) atmospheric refraction
c) wind vibrations
d) earth's curvature
Answer: a
Explanation: Atmospheric refraction, wind vibrations, earth's curvature are natural errors. error due to a defective joint is an instrumental errors.

38. Which of the following is not a principle source of error in levelling?
a) instrumental error
b) natural error
c) personal error
d) Systematic error
Answer: d
Explanation: All levelling measurements are subjected to three principal source of errors. Systematic error is also called cumulative error.

39. Errors in sighting is _____
a) instrumental error
b) natural error
c) personal error
d) Systematic error
Answer: c
Explanation: Errors in sighting is a personal error. Mistakes in manipulation, mistakes in rod handling, mistakes in reading the rod etc also come under personal error.

40. Wind vibrations are natural errors.
a) True
b) False
Answer: a
Explanation: Wind vibrations is a natural error. Atmospheric refraction, settlement of tripod or turning points, wind vibrations are natural errors.

41. When distances are small which of the following error is negligible?
a) error due to defective joint
b) atmospheric refraction
c) wind vibrations
d) earth's curvature
Answer: d
Explanation: The effect of curvature is to increase rod reading. When the distances are small the error is negligible.

42. Due to refraction, staff reading decreases.
a) True
b) False
Answer: a
Explanation: Due to refraction, the ray of light bends downwards in the form of a curve with its concavity towards the earth surface, thus decreases the staff readings.

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05 – Contouring	Marks:-10

Content of Chapter:-

5.1 Contour, contour interval, horizontal equivalent.
5.2 Contour maps: Characteristics and uses
5.3 Methods of Contouring: Direct and indirect
5.4 Methods of interpolation of contours: approximate, arithmetic and graphical
5.5 Toposheets: Study.

1. What is the term used for an imaginary line on the ground joining points of equal elevation?
a) Level line
b) Line of sight
c) Datum
d) Contour
Answer: d
Explanation: A Contour is an imaginary line on the ground joining the points of equal elevation. It is a line in which the surface of the ground is interested in a level surface.

2. Which of the following lines, in which surface of the ground is intersected by a level surface?
a) Level line
b) Line of sight
c) Datum
d) Contour
Answer: d
Explanation: A Contour is an imaginary line on the ground joining the points of equal elevation. It is a line in which the surface of the ground is interested in a level surface.

3. A Contour line is a line on the map representing a contour.
a) True
b) False
Answer: a
Explanation: A Contour is an imaginary line on the ground joining the points of equal elevation. It is a line in which the surface of the ground is interested in a level surface. A Contour line is a line on the map representing a contour.

4. Which of the following is not used to represent the relative altitudes of the points on the map?
a) Contour lines
b) Hachures
c) Shading
d) Level lines
Answer: d
Explanation: On a plan, the relative altitudes of the points can be represented by shading, Hachures,

form lines or contour lines. Out of these, contour lines are most widely used because they indicate the elevations directly.

5. Which of the following indicates the elevations directly?
a) Level line
b) Line of sight
c) Datum
d) Contour
Answer: d
Explanation: A Contour is an imaginary line on the ground joining the points of equal elevation. It is a line in which the surface of the ground is interested by a level surface. On a plan, the relative altitudes of the points can be represented by shading, Hachures, form lines or contour lines. Out of these, contour lines are most widely used because they indicate the elevations directly.

6. The vertical distance between any two contours is called a contour interval.
a) True
b) False
Answer: b
Explanation: The vertical distance between any two consecutive contours is called a contour interval. The contour interval is kept constant for a contour plan.
7. The horizontal distance between two points in two consecutive contours is known as the vertical equivalent.
a) True
b) False
Answer: b
Explanation: The horizontal distance between two points in two consecutive contours is known as the horizontal equivalent. It depends on the steepness of ground.

8. For every flat ground, a small contour interval is necessary.
a) True
b) False
Answer: a
Explanation: A contour interval chosen for a flat ground will be highly unsuitable for undulated ground. For every flat ground, a small interval is necessary
.
9. If the ground is more broken, greater contour interval should be adapted.
a) True
b) False
Answer: a
Explanation: A contour interval chosen for a flat ground will be highly unsuitable for undulated ground. If the ground is more broken, greater contour interval should be adapted
.
10. The contour interval should be inversely proportional to the scale.
a) True
b) False
Answer: a
Explanation: If the scale is small, the contour interval should be large. If the scale is large, the contour interval should be small.

11. Two contour lines of different elevations unite to form one line only in the case of _____
a) Hills
b) Vertical cliff
c) Horizontal cliff
d) Overhanging Cliff
Answer: b
Explanation: Two contour lines of different elevations cannot cross each other. However, contour lines of different elevations can unite to form one line in case of vertical Cliff.

12. Two contour lines of different elevations cannot cross each other.
a) True
b) False
Answer: a
Explanation: Two contour lines of different elevations cannot cross each other. If they did, the point of intersection would have two different elevations which are absurd.

13. In which of the following cases contour lines of different elevations can intersect?
1) Caves, 2) Vertical cliffs, 3) Hills, 4) Overhanging Cliff
a) 1) and 2)
b) Only 1)
c) 1), 2) and 4)
d) 1) and 4)
Answer: d
Explanation: Two contour lines of different elevations cannot cross each other. However, contour lines of different elevations can intersect only in case of an overhanging Cliff and a cave.

14. Contour lines close together indicate _____ slope.
a) Steep
b) Gentle
c) Uniform
d) Undulated
Answer: a
Explanation: Contour lines close together indicate steep slope. They indicate a gentle slope if they are far apart.

15. A series of straight parallel and equally spaced contours represent _____
a) Hills
b) Ponds
c) Plane surface
d) Desert
Answer: c
Explanation: A series of straight, parallel and equally spaced contours represent a plane surface. Equally spaced represent uniform slope.

16. A Contour passing through any point is parallel to the line of steepest slope at that point.
a) True
b) False
Answer: b
Explanation: A Contour passing through any point is perpendicular to the line of steepest slope at the point. This agrees with since the perpendicular distance between contour lines is the shortest distance.

17. A closed contour line with one or more higher ones inside to represent _____
a) Hill
b) Pond
c) River
d) Cliff
Answer: a
Explanation: A closed contour line with one or more higher ones inside to represent a hill. Similarly, closed contour line with one or more lower ones inside it indicates a depression without an outlet.

18. To contour lines having the same elevations cannot unite and continue as one line.
a) True
b) False
Answer: a
Explanation: To contour lines having the same elevations cannot unite and continue as one line. Similarly, a single contour cannot split into two lines.

19. A single contour line can split into two in case of a change in elevations.
a) True
b) False
Answer: b
Explanation: To contour lines having the same elevations cannot unite and continue as one line. Similarly, a single contour cannot split into two lines.

20. A contour line must close upon itself.
a) True
b) False
Answer: a
Explanation: A contour line must close upon itself. Though not necessarily within the limits of the maps.

21. Contour lines cross a watershed or ridge line at _____
a) 90°
b) 100°
c) 45°
d) 30°
Answer: a
Explanation: Contour lines cross a watershed or ridge line at right angles. The form curves of U shape round it with the concave side of the curve towards the higher ground.

22. What is the shape of contour lines in case of a valley?
a) U shape
b) V shape
c) W shape
d) O shape
Answer: b
Explanation: Contour lines cross a valley line at right angles. They form sharp curves of V shape across it with the convex side of the curve towards the higher ground.

23. What is the shape of contour lines in case of a watershed?
a) U shape
b) V shape
c) W shape
d) O shape
Answer: a
Explanation: Contour lines cross a watershed or ridge line at right angles. The form curves of U shape around it with the concave side of the curve towards the higher ground.

24. The same contour appears on either sides of a ridge or valley, for the highest horizontal plane that interests the ridge must cut it on both sides.
a) True
b) False
Answer: a
Explanation: The same contour appears on either sides of a ridge or valley, for the highest horizontal plane that interests the ridge must cut it on both sides. The same is true in case of a lower horizontal plane that cuts a valley.

25. Contours can be found in a _____ map.
a) Political
b) Topographical
c) Physical
d) Thematic
Answer: b
Explanation: These are imaginary lines, which passes through points of same or equal elevations. These are found in topographical maps to represent features like mountains, valleys, etc.

26. Contour Maps are not mandatory in civil engineering projects like road works, dams, canals,
etc.
a) True
b) False
Answer: b
Explanation: To identify a suitable site for these projects, to study the nature of ground and slopes and to make an estimate for earth work, a contour map of that region is required.

27. How many methods of contouring are present?
a) 5
b) 3
c) 2
d) 4
Answer: c
Explanation: There are 2 methods of contouring: direct and indirect. In direct method, the points of elevation are located physically and then plotted on the map. Indirect method uses contouring with the help of grids.

28. Indirect methods uses how many methods?
a) 3
b) 4
c) 2
d) 6
Answer: a
Explanation: The three methods are: method of a square (area divided into squares and grid point taken), method of cross-section (cross sectional points taken) and tacheometric method (adopted for very steep hills).

29. The commonly used squares in the method of a square is:
a) 10m x 10m to 5m x 5m
b) 10m x 10m to 15m x 15m
c) 5m x 5m to 20m x 20m
d) 5m x 5m to 10m x 15m
Answer: c
Explanation: The size of the square varies from 5m x 5m to 20m x 20m. These grid points are found by levelling and then plotted on drawing sheets.

30. Which of the below methods is used for interpolating contour points between 2 points?
a) Arithmetic calculation
b) Using measuring tapes
c) Taking pictures of area
d) Using a theodolite
Answer: a
Explanation: There are 3 different ways to interpolate contour points between 2 points; arithmetic calculation, estimation and graphical or mechanical method.

31. The contour interval is the same for all purposes.
a) True
b) False
Answer: b
Explanation: The interval is kept as 2m for large projects like highways, railways, etc and 0.5m for earth work, building sites, etc.

32. The curves used for drawing lines between points in a contour line is:
a) Radial curve
b) French curve
c) C-curve
d) Inverted curve
Answer: b
Explanation: The contour points are first located. Corresponding points are joined by a smooth line and for curves, a French curve is used.

33. Which shaped lines indicate the presence of a ridge?
a) V-shaped
b) U-shaped
c) L-shaped
d) S-shaped
Answer: b
Explanation: The contour line with U-shape, which has convexity towards a lower ground shows the presence of a ridge.

34. The line which separates the catchment basin from the rest of the area is:
a) Ridge line
b) Dam line
c) Catchment line
d) Watershed line
Answer: d
Explanation: The area where rain water drains into the river is the catchment area of the river. The watershed line is then marked. The area inside this line is measured in order to study flood levels.

06 – Measurement of Area and Volume	Marks:-06
Content of Chapter:- 6.1 Digital planimeter: Components and uses 6.2 Measurement of area using digital planimeter.(No problems to be asked for Exams) 6.3 Measurement of volume of reservoir from contour map. (No problems to be asked for exams)	

1. Planimeter is an instrument which is used for_____
a) Locating co-ordinates
b) Transferring point from paper to ground
c) Measuring area of plan
d) Sighting parallel and perpendicular points to station
Answer: c
Explanation: By the use of planimeter, the area of the land can be measured which is used for processing. Plumb bob is used for transferring point from paper to ground and alidade for sighting parallel and perpendicular points to station.

2. The formula for finding area by the use of planimeter is_____
a) $\Delta = M(F-I\pm10N+C)$
b) $\Delta = M(F+I\pm10N+C)$
c) $\Delta = M(F-I\pm10N-C)$
d) $\Delta = M(F-I\pm10N\pm C)$
Answer: a
Explanation: The area of the obtained figure can be calculated by, $\Delta = M(F-I\pm10N+C)$
Where, F = Final reading, I = Initial reading, N = number of times the zero mark of the dial passes the fixed index mark, M = A multiplying constant, C = Constant of the instrument which when multiplied by M.

3. Which of the following methods will give the best output for area?
a) Area by double mean distances
b) Area by triangles
c) Area by co-ordinates
d) Area by planimeter
Answer: b
Explanation: The area calculated by forming triangles will be able to give the best output because it involves formation of frame work.

4. Multiplier constant(M) is also known as_____
a) Planimeter constant
b) Tacheometric constant
c) Meridian constant
d) Simpson's constant
Answer: a
Explanation: From the formula of area by planimeter, Δ = M (F-I±10N+C) the variable M represents multiplier constant which is required for further calculations.

5. Multiplier constant is equal to_____
a) A+n'
b) A*n'
c) A/n'
d) n'/A
Answer: c
Explanation: The value of multiplier constant is given as M= A/n' in which,
A = known area, n' = change in wheel readings.

6. Calculate the area if I = 8.257, M = 150 sq.cm, F = 4.143, C = 31.155.
a) 6255.15
b) 2565.15
c) 2655.15
d) 2556.15
Answer: d
Explanation: The area can given by, A=M (F- I ± 10N + C)
On substituting, I = 8.257, M = 150 sq.cm, F = 4.143, C = 31.155 and N = -1
A = 150 (4.143- 8.257- 10 + 31.155) = 2556.15sq.cm.

7. Which of the following mathematical operations can be used for area computation?
a) Euler's equation
b) Simpson's one-third rule
c) Quadratic equation
d) Simultaneous differential equation
Answer: b
Explanation: Simpson's one-third rule assumes that the short length of the boundary between the ordinates is parabolic arc and this method is more useful when the boundary line departs considerably from the straight line.

8. Simpson's rule is capable of producing more accurate results.
a) True
b) False
Answer: a
Explanation: The results obtained by the use of Simpson's rule are more accurate in all cases. The result obtained is smaller than those obtained by using the trapezoidal rule.

9. Find the value of the multiplier constant if the length of the arm is given as 45.78 m and diameter as 2.54 m.
a) 643.86 sq. m
b) 436.86 sq. m
c) 346.68 sq. m
d) 364.86 sq. m
Answer: d
Explanation: The value of multiplier constant can be given as M = L * circumference
Circumference = π * D = π *2.54 = 7.97 m. On substitution, we get
M = 45.78 * 7.97 = 364.86 sq. m.

10. If the area of traverse is drawn to a scale 1" = 23 ft, find the change in area if the original area is 497.76 sq. in.

a) 6.04 sq. m
b) 6.04 m
c) 6.04 sq. in
d) 6.04 acres

Answer: d

Explanation: Here, the scale is given as 1" = 23 ft. So, 1 sq. in = 23*23 sq. ft
And the area of the field can be given as (23*23*497.76) / 43560 = 6.044 acres.

11. Find the value of I if the area of the field is given as 234.315 sq. m, M = 22.15 sq. m, F = 3.256, N = 1, C = 26.43.

a) 21.907 sq. m
b) 29.107 sq. m
c) 29.701 sq. m
d) 23.071 sq. m

Answer: b

Explanation: The area of the field can be given as A=M (F- I ± 10N + C). On substitution of the given values we get,
234.315 = 22.15 (3.256-I+10+26.43)
I = 29.107 sq. m

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