49/2023

Question Booklet Alpha Code	**M**	Question Booklet Serial Number

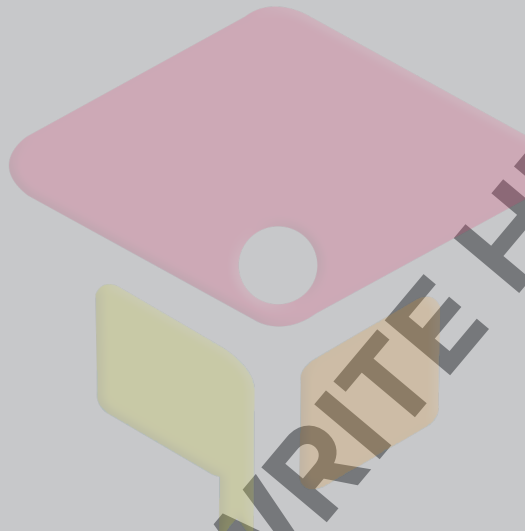| Total Number of questions : 100	Time : 1 Hour 30 Minutes
Maximum Marks : 100	

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet Alpha Code viz. A, B, C & D.

2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.

3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.

4. If you get a question booklet where the Alpha Code does not match to the allotted Alpha Code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.

5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is unnumbered, please get it replaced by new question booklet with same Alpha Code.

6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.

7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so, he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same Alpha Code. This is most important.

8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.

9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**

10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.

11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**

12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.

13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

1. The survey which is carried out for the construction of roads, parks, water supply system, sewer and other constructional works for any developing township is called

   (A) Cadastral Survey
   (B) City Survey
   (C) Hydrographic Survey
   (D) Topographic Survey

2. 1 acre = _____ sq. chains

   (A) 15
   (B) 20
   (C) 10
   (D) 100

3. The survey in which curvature of earth is taken into account is called

   (A) Plane Survey
   (B) Geodetic Survey
   (C) Hydrographic Survey
   (D) Geological Survey

4. The main principle of survey is

   (A) Work from whole to the part
   (B) Work from part to whole
   (C) Minor control points are established first
   (D) None of the above

5. To obtain true measurements of lines on a map using a wrong scale the following formulae is used

   (A) $\dfrac{RF \text{ of wrong scale}}{RF \text{ of correct scale}} \times measured\ length$

   (B) $\dfrac{RF \text{ of correct scale}}{RF \text{ of wrong scale}} \times measured\ length$

   (C) $\dfrac{(RF \text{ of correct scale})^2}{(RF \text{ of wrong scale})^2} \times measured\ length$

   (D) $\dfrac{(RF \text{ of wrong scale})^2}{(RF \text{ of correct scale})^2} \times measured\ length$

6. The engineers scale of a drawing is stated to be 1 cm = 4 m. Convert this to fraction scale

   (A) 1:40
   (B) 4:1
   (C) 1:400
   (D) 40:1

7. The vernier which extend or increase in opposite direction of their main scales and also in which the smallest division of the vernier is longer than the smallest division of their main scale is called

   (A) Direct vernier
   (B) Retrograde vernier
   (C) Single vernier
   (D) Double vernier

8. 1 nautical mile = _____ km.

(A) 18.52   (B) 1.852

(C) 185.2   (D) 1852

9. Plane surveys are considered upto an area of

(A) 200 sq km   (B) 300 sq km

(C) 260 sq km   (D) 150 sq km

10. The graphical representation of the features on the earth surface or below the earth surface as projected on a horizontal plane is called

(A) Topographical Map   (B) Geographical Map

(C) Plan   (D) Both A and B

11. The chain line joining two subsidiary survey stations is called

(A) Auxiliary line   (B) Tie line

(C) Subsidiary line   (D) All of the above

12. The field work of chain surveying is carried out in the following steps

(A) Reconnaissance, Running Survey lines, Marking Stations

(B) Reconnaissance, Marking Stations, Running Survey lines

(C) Marking Stations, Reconnaissance, Running Survey lines

(D) None of the above

13. In a Cross staff survey in the field the area is divided into

(A) Number of triangles and trapezoids

(B) Number of rectangles and trapezoids

(C) Number of right angled triangles and trapezoids

(D) Number of right angled triangles only

14. A field book is of size

(A) 20cm x 10cm   (B) 12cm x 15cm

(C) 20cm x 12cm   (D) 20cm x 15cm

15. Invar tape is made up of an alloy of

(A) 30% Nickel and 70% Steel   (B) 36% Nickel and 64% Steel

(C) 64% Nickel and 36% Steel   (D) 70% Nickel and 30% Steel

16. 1 link of Engineers chain = _____ feet
    (A) 100   (B) 10
    (C) 1   (D) 0.1

17. The process of making a number of intermediate points on a survey line joining two stations in the field is called
    (A) Levelling   (B) Surveying
    (C) Ranging   (D) All of the above

18. While chain surveying the person who holds the handle of the chain in contact with the peg at the beginning is called
    (A) Leader   (B) Follower
    (C) Both A and B   (D) None of the above

19. Stepping method to measure horizontal distances are mostly done at
    (A) Slope down hill   (B) Plane surface and slopes down hill
    (C) Plane surface only   (D) None of the above

20. While chaining a slope the arrow should be placed forward in the line by an amount
    (A) $100(\sec\theta - 1)$ (B) $100(\cos\theta - 1)$
    (C) $100(\sin\theta - 1)$ (D) $100(\tan\theta - 1)$

21. Sag correction of a tape is
    (A) Always positive   (B) Always negative
    (C) Can be positive or negative   (D) None of the above

22. Incorrect holding of chain is
    (A) Positive Cumulative Error   (B) Negative Cumulative Error
    (C) Compensating Error   (D) None of the above

23. The working edge of an alidade is called
    (A) Bevelled edge   (B) Blunt edge
    (C) Fiducial edge   (D) All of the above

24. The process of putting the plane table to some fixed direction so that the line representing a certain direction on the plane is parallel to the direction in ground is called
    (A) Centring   (B) Levelling
    (C) Orientation   (D) Sighting

25. Triangle of error is formed in which of the following methods?

(A) Tracing paper method

(B) Bessel's Graphical Solution

(C) Lehman's Method

(D) None of the above

26. The compass used for orientation of plane table is

(A) Surveyors Compass

(B) Prismatic Compass

(C) Trough Compass

(D) All of the above

27. The process of determining the plotted position of the station occupied by plane table by means of sights taken towards known points, location of which have been plotted is

(A) Resection

(B) Radiation

(C) Intersection

(D) Traversing

28. Plumbing fork is used for

(A) Centring

(B) Levelling

(C) Orientation

(D) Sighting

29. Intersection method is also called

(A) Stepping method

(B) Graphic triangular method

(C) Tracing paper method

(D) Trial and error method

30. The plain alidade is used for

(A) Sighting

(B) Orientation

(C) Centring

(D) All of the above

31. In quadrantal bearing system, a whole circle bearing of 189° 30' can be expressed as

(A) W 23° 30' N

(B) W 9° 30' S

(C) S 9° 30' W

(D) N 23° 30' W

32. Lines connecting points at which the declination is zero are known as

(A) Isogonic lines

(B) Agonic lines

(C) Isoclinic lines

(D) Contour lines

33. The magnetic bearing of a line AB is S 58°30' E. Calculate the true bearing if the declination is 6° 30' W

(A) S 65°00' E

(B) S 65°00' W

(C) S 52°00' W

(D) S 52°00' E

34. Extent of diurnal variation of magnetic declination
    (A) greater at the equator and less at the poles
    (B) less at the equator and greater at the poles
    (C) same at both equator and at the poles
    (D) does not depend on the locality

35. Agate cap is fitted with a
    (A) cross staff   (B) Dumpy level
    (C) Chain   (D) Prismatic compass

36. The graduations in prismatic compass
    i) are inverted
    ii) are upright
    iii) run clockwise having 0° at north
    iv) run clockwise having 0° at south
    The correct statements are
    (A) (i) and (iii)   (B) (i) and (iv)
    (C) (ii) and (iii)   (D) (ii) and (iv)

37. If the fore bearing of a line AB is 85° and that of line BC is 105° then the included angle between the lines is
    (A) 20°   (B) 75°
    (C) 190°   (D) 160°

38. Which of the following statements is true for a line AB?
    (A) Fore bearing of line AB and back bearing of AB differ by 180°
    (B) Fore bearing of AB and back bearing of BA differ by 180°
    (C) Both (A) and (B) are correct
    (D) None of the above are correct

39. The horizontal angle between true meridian and a line is known as
    (A) Magnetic bearing   (B) Azimuth
    (C) Fore bearing   (D) Assumed bearing

40. The angle made by the lines of force of earth's magnetic field makes with the surface of earth is called
    (A) Declination   (B) Dip
    (C) Azimuth   (D) Bearing

41. Which of the following methods of contouring is most advantageous in case of a hilly terrrain?

    (A) Direct method
    (B) Square method
    (C) Cross sections method
    (D) Tacheometric method

42. Sensitiveness of a level tube can be increased by

    (A) Increasing the viscosity of liquid
    (B) Decreasing the length of bubble
    (C) Increasing the diameter of the tube
    (D) Increasing the roughness of the walls

43. Staff reading recorded as fore sight is 0.500 taken on a station of Reduced level 302.250. If RL of benchmark is 300.000 calculated value of the Back sight is

    (A) 2.250
    (B) 2.100
    (C) 2.050
    (D) 2.750

44. The staff reading taken at stations A, B, C, D from a single setup of level are 0.920, 2.255, 1.805, 1.700. Choose the correct statement from the following

    (A) A is the highest station
    (B) B is the highest station
    (C) C is lower than B
    (D) D is higher than A

45. A back sight reading of 1.655 was observed at a point P whose RL is 100.000m. Find the RL of a point Q at which the observed staff reading is 1.500.

    (A) 101.655
    (B) 100.155
    (C) 101.500
    (D) 100.000

46. A staff is held at a distance of 1400m from a level. If the reading on the staff is 3.693 m, the reading corrected for curvature and refraction combined is

    (A) 3.561
    (B) 3.825
    (C) 3.847
    (D) 3.715

47. In which of the following cases several contours coincide, horizontal equivalent being zero?

    (A) Overhanging cliff
    (B) Hill
    (C) Vertical Cliff
    (D) Valley

48. Which of the following is not a method for interpolation of contours?

    (A) Spot levelling
    (B) Graphical method
    (C) Arithmetic method
    (D) Estimation

49. The advantage of reciprocal levelling is that
    (A) It eliminates the error due to curvature and refraction
    (B) It eliminates collimation error
    (C) Both (A) and (B)
    (D) None of these

50. System of levelling chiefly employed for establishing bench marks with high precision is
    (A) Longitudinal levelling
    (B) Fly levelling
    (C) Profile levelling
    (D) Precise levelling

51. A line laying on the ground maintaining a constant inclination to the horizontal is known as
    (A) Grade contour
    (B) Contour line
    (C) Agonic lines
    (D) Isoclinic lines

52. The line of sight may not be perpendicular to the vertical axis in case of
    (A) Dumpy level
    (B) The Wye level
    (C) Tilting level
    (D) None of the above

53. While traversing anticlockwise a closed traverse of n sides, theoretical sum of included angles should be
    (A) 360°
    (B) (2n – 4) x 90
    (C) (2n + 4) x 90
    (D) (2n ± 4) x 90

54. In Bowditch rule of traverse adjustment it is assumed that errors in the linear measurements are
    (A) Inversely proportional to √L
    (B) Proportional to √L
    (C) Proportional L
    (D) Inversely Proportional L

55. The process of establishing intermediate points, between two end points which are not intervisible, with the help of a theodolite is known as_____
    (A) Interpolation
    (B) Balancing-in
    (C) Ranging
    (D) Lining-in

56. The bench mark established by the survey of India department with very high precision with reference to mean sea level at Karachi as the datum are called
    (A) Permanent Bench Mark
    (B) G.T.S. Bench Marks
    (C) Arbitrary Bench Marks
    (D) Temporary Bench Marks

57. In plate level test of theodolite, vertical axis is made truly vertical by manipulating
    (A) Capstan screws
    (B) Wing nuts
    (C) Foot screws
    (D) Shifting centre arrangement

58. Closing error in a stadia traverse should not exceed _____ where p is perimeter of the traverse.
    (A) 0.01 √p
    (B) 0.01 p
    (C) 0.055 √p
    (D) 20 p

59. 'SPIRE TEST' is used in permanent adjustment of theodolite for adjusting the
    (A) Vertical axis
    (B) Line of sight
    (C) Horizontal axis
    (D) Plate levels

60. Bowditch rule is applied to
    (A) Determine effect of local attraction
    (B) A closed traverse for adjustment of closing error
    (C) An open traverse for graphical adjustment
    (D) None of these

61. Mean sea level at any place is the average datum of hourly tide height observed over a period of nearly
    (A) 50 years
    (B) 19 years
    (C) 5 years
    (D) 10 years

62. If L is latitude and D is departure, then closing error is given by
    (A) $[\,(\Sigma L^2 + \Sigma D^2)\,]$
    (B) $\sqrt{(\Sigma L + \Sigma D)}$
    (C) $\sqrt{(\Sigma L^2 + \Sigma D^2)}$
    (D) None of these

63. What is the purpose of using theodolite primarily?
    (A) To measure inclined angle only
    (B) To measure vertical angle only
    (C) To measure horizontal and vertical angles
    (D) To measure horizontal angle only

64. In a theodolite the line of collimation is
    (A) Perpendicular to the trunnion axis
    (B) Parallel to the vertical axis
    (C) Parallel to axis of plate levels
    (D) Parallel to the horizontal axis

65. Size of a theodolite is specified by
    (A) Diameter of upper plate
    (B) Diameter of lower plate
    (C) Diameter of vertical circle
    (D) Length of telescope

66. Tachometric method is more suitable method for preparing the contour map of a
    (A) Hill
    (B) Valley
    (C) Plain surface
    (D) Ridge

67. The process of measuring depth below the water surface is called
    (A) Chaining
    (B) Sounding
    (C) Levelling
    (D) Traversing

68. Which survey is used for establishing mean sea level?
    (A) Chain
    (B) Hydrographic
    (C) Compass
    (D) Tacheometry

69. What is the use of Fathometer?
    (A) Ocean levelling
    (B) Ocean sounding
    (C) Ranging
    (D) Wind measuring

70. Which is the most accurate method of locating the soundings?
    (A) Range and one angle from the shore
    (B) Cross rope
    (C) Range and time intervals
    (D) Two angles from the shore

71. The tangential method of tacheometry is
    (A) Faster than stadia hair method
    (B) Slower than stadia hair method
    (C) Preferred as chance of operational error are less compared to stadia hair method
    (D) Preferred as it involves less computations to get reduced distances.

72. Which of the given below branches of surveying is used to measure horizontal and vertical distances without the use of chain and tape?
    (A) Contouring
    (B) Levelling
    (C) Tacheometry
    (D) Traversing

73. What is the reduced level of the sub-marine surface in terms of the adopted datum?
    (A) Elevation
    (B) Datum surface
    (C) Reduced sounding
    (D) Bench mark

74. Which survey is used for the determination of shore lines?
    (A) Theodolite
    (B) Compass
    (C) Hydrographic
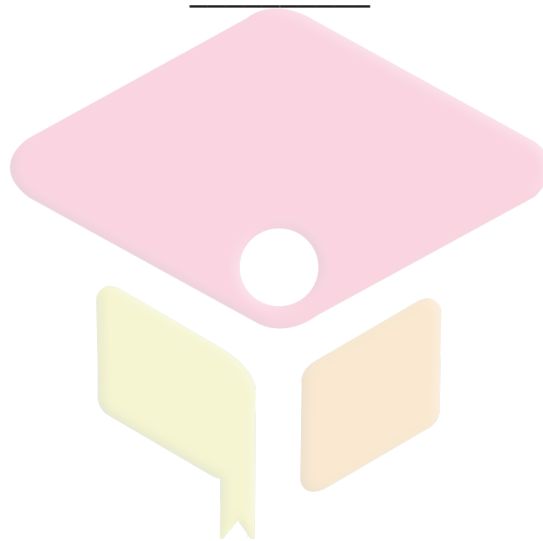   (D) Topographic

75. The desirable multiplying and additive constants for a tacheometer is
    (A) 200 and 0.15 m
    (B) 100 and 0.3 m
    (C) 100 and 0 m
    (D) 50 and 0.5 m

76. The length of the long chord of a simple circular curve is
    (A) twice the apex distance
    (B) twice the tangent length
    (C) twice the mid ordinate
    (D) twice the radius of the curve

77. A transition curve is essentially used to
    (A) generate more frictional forces for stability
    (B) allow vehicles to have increased speed while driving
    (C) negate the effect of centrifugal forces
    (D) avoid abrupt change in radius from a straight line to a finite radius curve

78. In designing curves based on maximum friction, the minimum radius is given by
    (A) v^2 / g
    (B) $v^2 / \tan\theta$
    (C) $v / \mu \tan\theta$
    (D) $v^2 / \mu g$

79. The ideal transition curve is called a
    (A) clothoid
    (B) cubic spiral
    (C) cubic parabola
    (D) hyperbola

80. In the case of vertical curves, a 3 per cent gradient means that the ground rises
    (A) 1 m for every 3 m
    (B) 03 m for every 100 m
    (C) 0.03 m for every m
    (D) 3m for every 100 m

81. In the case of vertical curves, the curves are generally in the form of
    (A) simple circular curves
    (B) compound curves
    (C) simple reverse curves
    (D) parabolic curve

82. In case of vertical parabolic curves, the rate of change of gradient is
    (A) always negative
    (B) always positive
    (C) zero
    (D) constant

83. A compound curve has
    (A) a simple circular curve and a transition curve at one end
    (B) a simple circular curve and transition curve at both ends
    (C) the equation of a clothoid
    (D) two or more simple circular curves of different radii

84. A reverse curve is one

(A) with a simple circular curve and a transition curve

(B) where the simple circular curve is set from the second tangent point in the reverse direction

(C) having two simple circular curves with centres in opposite directions

(D) having half circular and half cubic parabola as a compound curve

85. The term shift used in transition curve is

(A) the movement of the centre of the circular due to introduction of transition curve

(B) the movement of the circular curve inwards to accommodate the transition curve

(C) the movement of the tangent of the circular curve because of the transition curve

(D) the shift in the point of intersection to accommodate the transition curve

86. A smart station is

(A) a total station with software to calculate and display many quantities

(B) a total station with an integrated GPS module

(C) with display units on both sides

(D) a total station attached to computer

87. Remote sensing is

(A) collecting information without being in contact with the objects

(B) measuring angles

(C) measuring heights

(D) using a total station to collect data about the terrain

88. In active remote sensing

(A) an internal energy source is used for remote sensing

(B) an external energy source is used for remote sensing

(C) continuous emission of energy is used

(D) continuous receiving of radiation is done

89. Scattering is

(A) when the source emits energy in all directions

(B) when the emitted and received radiation are different

(C) diffusion of radiation due to atmosphere
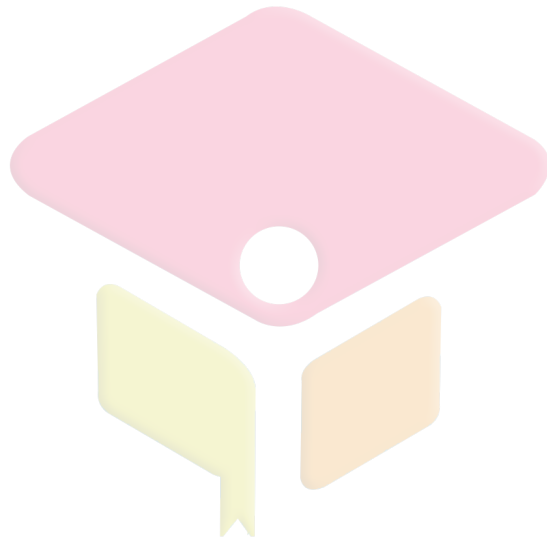
(D) a defect in the scanning system

90. The position of a point can be located in GPS on receiving signals from at least
   (A) 1 satellite
   (B) 2 satellites
   (C) 3 satellites
   (D) 4 satellites

91. A major requirement of GIS application is
   (A) the need to manage spatially referenced data
   (B) images from satellites
   (C) vector data structure
   (D) rastor data structure

92. Electromagnetic distance measuring instruments use
   (A) radiation frequencies from visible light to microwaves
   (B) radiation frequencies like x-rays
   (C) radiation frequencies like gamma rays
   (D) radio waves

93. In GPS, receivers used are
   (A) electronic clocks
   (B) atomic clocks
   (C) quartz clocks
   (D) mechanical clocks

94. For a closed traverse of 4 sides, the sum of exterior angles is
   (A) 360°
   (B) 720°
   (C) 1080°
   (D) 1440°

95. Which one of the following is not a contouring software package?
   (A) Map info
   (B) Geographic Exploration system
   (C) TRANSYT
   (D) AutoCAD

96. The length to height ratio of a closed filled arrow head is
   (A) 1:3
   (B) 3:1
   (C) 1:2
   (D) 2:1

97. The fillet command in AutoCAD creates
   (A) sharp corners
   (B) round corners
   (C) angled corners
   (D) smooth corners

98. In AutoCAD, status bar does not contain
   (A) snap
   (B) grid
   (C) erase
   (D) polar

99. To draw smooth curves of any nature, draughting instruments used is

(A) Mini-drafter

(B) French curve

(C) Templates

(D) Eraser Shield

100. The inclination of letters as recommended by BIS is

(A) 75°

(B) 70°

(C) 65°

(D) 60°