1. Survey used for unearthing relics of antiquity is
   A) Military survey
   B) Mine survey
   C) Geological survey
   D) Archaeological survey

2. Which of the following sentence is correct about the chain ?
   i. Length of a link is the distance between the centers of two consecutive middle rings.
   ii. Length of the chain is measured from the out side of one handle to the inside of other handle.
   A) Only i
   B) Only ii
   C) Both i and ii
   D) Neither i nor ii

3. Invar tapes are used mainly for linear measurements of a very high degree of precision due to its quality of
   A) Very high co-efficient of thermal expansion
   B) Less deformed than steel tapes
   C) It undergoes a small increase in length as time goes on
   D) It is made by alloy of iron

4. The magnetic needle in prismatic compass is
   A) Edge bar type
   B) Broad needle
   C) Bar shaped needle
   D) Damped needle

5. The magnetic bearing of a line is 38°24′. Calculate the true bearing if the magnetic declination is 5°10′ East.
   A) 42°20′
   B) 43°20′
   C) 43°34′
   D) 33°14′

6. Which of the following is not the error in compass surveying ?
   A) Instrumental error
   B) Personal error
   C) Error due to natural causes
   D) None of the above

7. The WCB of line OA is 107°12′, line OB is 271°42′, calculate the angle AOB.
   A) 164°30′
   B) 198°54′
   C) 72°48′
   D) 100°20′

8. Convert 320°45′12″ into RB
   A) N 40°15′48″ W
   B) N 39°14′48″ E
   C) N 39°14′48″ W
   D) N 40°15′48″ E

9. Which of the following statement is not correct about HI method of levelling ?
   i. The method is more rapid, less tedious and simple.
   ii. Height of instrument is not at all calculated.
   iii. This method provides complete check on Intermediate sights.
   A) Only i and ii B) Only ii and iii C) Only i and iii D) All i, ii and iii

10. Working edge of an alidade in plane table surveying is called
   A) Fiducial edge B) Straight edge C) Levelled edge D) Drawing edge

11. If the lower clamp screw is tightened and the upper clamp screw is loosened, then the theodolite may rotate on its
   A) outer spindle without relative motion between vernier and graduated scale on lower plate
   B) inner spindle with relative motion between vernier and graduated scale on lower plate
   C) inner spindle without relative motion between vernier and graduated scale on lower plate
   D) outer spindle with relative motion between vernier and graduated scale on lower plate

12. The tacheometric system that utilises the principle of measuring the distance between two points by sighting a target with 2 fixed points in the telescope is
   A) Subtense system B) Stadia system
   C) Tangential system D) Analytic lens system

13. The significance of the additive constant in stadia tacheometry is
   A) It represents the focal length of the telescope
   B) It accounts for the distance from the instrument to the staff
   C) It is used to calculate the horizontal distance
   D) It is a fixed value used in all measurements

14. Consider the following tests for permanent adjustments of a theodolite
   1. Cross-hair ring test
   2. Plate level test
   3. Collimation in azimuth test
   4. Spire test
   5. Vertical circle test

   The correct order of the tests for permanent adjustments of a theodolite is
   A) 2-3-1-5-4 B) 2-1-3-4-5 C) 3-1-2-4-5 D) 3-2-1-5-4

15. According to Bowditch's rule, if L is the length of the line, the error in angular measurement is
   A) Inversely proportional to L B) Directly proportional to $\sqrt{L}$
   C) Directly proportional to L D) Inversely proportional to $\sqrt{L}$

16. Consider the following statements about Total Station.
    i. It measures both horizontal and vertical angles electronically.
    ii. Distance measurement is always based on prism reflection.
    iii. Atmospheric corrections are automatically applied in modern instruments.
    Which of the above statements are correct ?
    A) i and ii only B) i and iii only C) ii and iii only D) i, ii and iii

17. The ratio of length of long chord to tangent length of a simple circular curve of radius 'R' and deflection angle 'Δ' is
    A) 2 cos (Δ/2) B) 2 sin (Δ/2) C) 2 sec (Δ/2) D) 2 cosec (Δ/2)

18. A vertical curve has an upgrade of 1.4% followed by a downgrade of 1.0%. The rate of change of grade is 0.12% per chain of 20 m. The length of vertical curve is
    A) 420 m B) 440 m C) 400 m D) 380 m

19. The working principle involved in GPS is
    A) Resection B) Trisection C) Triangulation D) Trilateration

20. In a closed traverse, the sum of south latitude exceeds the sum of north latitudes and the sum of east departures exceeds the sum of west departures. The closing line will lie in the
    A) N-W quadrant B) S-E quadrant C) N-E quadrant D) S-W quadrant

21. Which of the following statements regarding building stones is incorrect ?
    A) Specific gravity of good building stone should generally be high
    B) Stones with high porosity are usually less durable
    C) Crushing strength of stone is important for load-bearing structures
    D) Stones with high water absorption possess superior frost resistance.

22. Which statement regarding silica in brick earth is incorrect ?
    A) It prevents excessive shrinkage
    B) It improves shape retention
    C) Excess silica makes bricks brittle
    D) Silica increases plasticity significantly

23. Low heat cement is mainly used in
    A) Thin plastering work
    B) Massive concrete structures like dams
    C) Brick manufacturing
    D) Tile fixing only

24. Stoneware pipes are commonly used for
A) Electrical wiring
B) Drainage and sewer lines
C) Roofing work
D) Reinforcement work

25. Pit sand is usually
A) Smooth and rounded
B) Sharp and angular
C) Salty
D) White in color

26. Commonly used coarse aggregate size for RCC work is
A) 5 mm B) 10 mm C) 20 mm D) 80 mm

27. Common cement mortar proportion for brick masonry is
A) 1:1 B) 1:2 C) 1:6 D) 1:10

28. Lower water-cement ratio generally gives
A) Lower strength
B) Higher strength
C) No change in strength
D) Higher permeability

29. Which statement regarding plasticizers is incorrect ?
A) They reduce water requirement for a given workability
B) They improve compaction of concrete
C) They significantly increase permeability of concrete
D) They may improve strength due to reduced water-cement ratio

30. Which of the following statements regarding anisotropic behavior of timber is incorrect ?
A) Strength parallel to grains is higher than perpendicular to grains
B) Shrinkage along grains is greater than across grains
C) Mechanical properties vary with grain direction
D) Timber behaves differently under loading in different directions

31. A brick laid with its length across the wall is called
A) Header B) Stretcher C) Jamb D) Quoin

32. A brick laid with its length in the direction of wall is called
A) Header B) Stretcher C) Jamb D) Quoin

33. Stepping of the unfinished end of the masonry wall is termed as
A) Raking back B) Pointing C) Toothing D) Indenting

34. Which type of bond is used for walls curved on plan for better alignment ?
A) English bond B) Flemish bond C) Stretcher bond D) Header bond

35. Selected long stones used to hold a stone masonry wall together transversally is termed as
A) Bond stone B) Hearting C) Corbel D) Plum stone

36. Stone masonry using dressed square stone blocks to given dimension and laid in courses is called
A) Ashlar masonry B) Uncoursed rubble masonry
C) Flint rubble masonry D) Polygonal rubble walling

37. Concrete in which permanent internal stresses are deliberately introduced, usually by tensioned steel, to counteract to the desired degree the stresses caused in the member in service.
A) Precast concrete B) High-strength concrete
C) Prestressed concrete D) Reinforced concrete

38. According to Kerala Municipal Building Rules, any building having more than four floors including basement or sunken floors, shall have at least _____ number of staircase/s.
A) One B) Two C) Three D) Four

39. According to Kerala Municipal Building Rules, ramps if provided as a substitute for stairways shall be laid with a slope not exceeding
A) 1 in 5 B) 1 in 8 C) 1 in 10 D) 1 in 15

40. Beam members of a roof truss carrying roof sheeting and supported by trusses is termed as
A) Girt B) Rafter C) Bracing D) Purlin

41. In a structure the point where bending moment changes its sign is called
A) Point of contraflexure B) Neutral axis
C) Shear center D) Plastic hinge

42. In simple bending theory, Young's modulus is assumed
A) Variable across the depth of beam
B) Same in tension and compression
C) Zero at neutral axis
D) Infinite

43. If a force is shifted along its line of action, the moment about any point
A) Changes B) Becomes zero
C) Remains unchanged D) Becomes infinite

44. Centroid of a semicircle from base is

A) $\frac{2r}{\pi}$ B) $\frac{2r}{3\pi}$ C) $\frac{4r}{\pi}$ D) $\frac{4r}{3\pi}$

45. In the theory of pure torsion, it is assumed that

A) Cross-sections warp freely
B) Material is anisotropic
C) Plane sections remain plane after twisting
D) Cross-sections are subjected to bending moment simultaneously

46. If the ultimate stress of a material is 800 MPa and the factor of safety is 4, the working stress is

A) 200 MPa B) 80 MPa C) 20 MPa D) 500 MPa

47. The area under the stress-strain curve represents

A) Hardness B) Toughness C) Elasticity D) Ductility

48. For a cantilever beam of length L carrying UDL w (N/m), the maximum bending moment is

A) $\frac{wL^2}{2}$ B) $\frac{wL^2}{4}$ C) $\frac{wL^2}{6}$ D) $\frac{wL^2}{3}$

49. Moment of resistance of a beam increases when

A) Allowable stress decreases
B) Section modulus increases
C) Load on beam increases
D) Beam length increases

50. Uniformly Distributed Load (UDL) produces

A) Constant shear force
B) Linear variation in shear force
C) Zero shear force
D) Linear variation in bending moment

51. Which of these statements are true regarding plinth area estimate for a building ?

i. Plinth area estimate is only approximate.
ii. Plinth area estimate should be calculated for the covered area by taking internal dimension of the building at the floor level.
iii. Courtyard and other open area should not be included in the plinth area.

A) Both i and ii
B) Both ii and iii
C) Both i and iii
D) None of these statements are true

52. The carpet area does not include the area of
A) The thickness of outer walls
B) Balconies and verandahs
C) Lifts and staircase
D) None of these are included

53. No deductions are made for openings each up to _____ sq m in masonry work.
A) 1 sq m
B) 10 sq m
C) 0.1 sq m
D) 0.001 sq m

54. The unit of measurement for DPC (Damp Proof Course) is
A) Square metre
B) Cubic metre
C) Running metre
D) Number

55. The multiplying factor for painting on corrugated sheet surfaces is
A) 1.04
B) 1.14
C) 1.25
D) 1.35

56. Which of the following statements are true ?
i. The product of centre line of the walls and area of cross-section of any item, gives total quantity of the item.
ii. The centre line is worked out separately for different sections of walls of a building.
iii. The centre line length is reduced by half the layer of main wall joining the partition wall.
A) All i, ii and iii
B) Only ii
C) Only i and ii
D) Only ii and iii

57. Pick up the correct statement(s) from the following :
i. For all building plans, site plans are prepared to a smaller scale showing the orientation of the building and boundaries of land.
ii. The site plan shows the position of roads, drains, sewer lines, water pipe lines and adjoining plots of lands.
iii. The North direction line is shown on one corner of the site plan to show the geographical orientation of the building.
A) i and ii
B) i, ii and iii
C) Only ii
D) Only iii

58. In revised estimate, the excess amount should not exceed
A) 2% of original estimate
B) 5% of original estimate
C) 10% of original estimate
D) There is no fixed limit

59. The net annual letting value of a property, which is obtained after deducting the amount of yearly repairs from the gross income is called
A) Capitalized value
B) Rateable value
C) Market value
D) Book value

60. Scrap value of a building is generally taken as
A) 2% of cost of construction
B) 5% of cost of construction
C) 10% of cost of construction
D) 20% of cost of construction

61. In irrigation design, how does a long, narrow catchment shape affect the peak runoff rate compared to a compact, fan-shaped catchment of the identical total area ?
A) The long catchment produces a higher peak runoff rate due to rapid concentration
B) The long catchment produces a lower peak runoff rate because the time of concentration is longer
C) Both catchment shapes produce identical peak runoff rates
D) The long catchment eliminates runoff entirely by forcing immediate deep percolation

62. What is the standard height of the rim of a standard non-recording type rain gauge (Symon's rain gauge) above the surrounding ground level to minimize water splashing ?
A) 10 cm
B) 30 cm
C) 75 cm
D) 120 cm

63. During which months does the typical sowing and harvesting cycle for Kharif crops take place in India ?
A) Sown in October – November; Harvested in March – April
B) Sown in January – February; Harvested in May – June
C) Sown in March – April; Harvested in June – July
D) Sown in June – July; Harvested in September – October.

64. Which specific method of surface irrigation is most hydraulically suited for orchard trees, where water is conveyed through small rings or rectangular channels constructed around the base of each individual tree ?
A) Basin or ring irrigation.
B) Contour farming
C) Free flooding
D) Furrow irrigation

65. A crop requires a total depth of water 120 cm over a base period of 120 days. What is the duty of this irrigation water in hectares per cumec ?
A) 432 ha/cumec
B) 1,000 ha/cumec
C) 864 ha/cumec
D) 1,200 ha/cumec

66. Which structural component of a diversion headwork is built perpendicular to the weir axis to isolate a pocket of calm water and reduce the velocity of flow entering the canal head regulator ?

A) Divide wall
B) Launching apron
C) Fish ladder
D) Silt excluder

67. Which type of earth dam is constructed by placing a highly impervious central core (typically made of well-compacted clay) flanked on both sides by relatively pervious outer shells of sand, gravel, or rockfill ?

A) Homogeneous earth dam
B) Zoned-embankment earth dam
C) Hydraulic-fill earth dam
D) Diaphragm-type earth dam

68. If a gravity dam fails by rotating and tilting forward around its lower downstream edge, what type of structural failure has occurred ?

A) Sliding failure
B) Crushing failure
C) Overturning failure
D) Tension failure

69. Which type of canal is designed to carry water directly from a main river or a reservoir without doing any direct irrigation itself, serving purely to supply water to another canal system ?

A) Branch canal
B) Carrier Canal
C) Feeder canal
D) Watercourse

70. At a specific intersection point, a natural stream has a bed level of 310.0 m and a High Flood Level (HFL) of 314.00 m. The crossing canal has a bed level of 306.50 m and a Full Supply Level (FSL) of 309.00 m. Which structure is required ?

A) Aqueduct
B) Superpassage
C) Canal Syphon
D) Level crossing

71. Which of the following statements is/are correct ?

I. Degree of saturation for a fully saturated soil is 100%.

II. The sum of percentage of air voids and degree of saturation is always 100% for a particular soil sample.

A) I only
B) both I and II
C) II only
D) neither I nor II

72. If porosity of a soil sample is found to be 50%, what will be its void ratio ?

A) 1/3
B) 1/4
C) 1
D) 1/2

73. Which of the following option is incorrect regarding various consistency limits of soil ?
    A) Liquid limit is the water content at which soil changes from the liquid state to the plastic state
    B) The maximum water content at which soil remains in plastic state is plastic limit
    C) Cone penetrometer is a test conducted to find liquid limit of soil
    D) The water content below which the soil cannot be compressed further by just reduction in water content is called shrinkage limit

74. If the particle size range is between 0.425 mm to 2.0 mm, then the soil sample is classified as
    A) Fine Sand B) Medium Sand C) Fine Gravel D) Coarse Sand

75. The water held by electrochemical forces existing on soil surface is known as
    A) Structural Water B) Free Water
    C) Adsorbed Water D) Capillary Water

76. Calculate the coefficient of permeability (in cm/sec) of a soil sample, 6 cm in height and 50 cm^2 in cross sectional area, if a quantity of water equal to 400 cm^3 in 10 minutes, under an effective constant head of 40 cm.
    A) 1/500 B) 3/25 C) 1/25 D) None of these

77. Which of the following is/are correct regarding proctor compaction tests ?
    I. The weight of hammer used in modified proctor test is 4.89 kg with drop height of 550 mm as per IS: 2720 (Part VIII)
    II. The weight of hammer used in standard proctor test is 2.6 kg with drop height of 310 mm as per IS: 2720 (Part VII)
    A) Both I and II B) Neither I nor II C) I only D) II only

78. Which of the following methods uses electrodes to conduct soil exploration ?
    A) Seismic refraction method B) Electrical resistivity method
    C) Both option A) and B) D) Neither option A) nor B)

79. Which of the following is not a limitation of plate load test ?
    A) The test results reflect only the character of soil located within a depth of twice the width of footing. Actual values will depend on properties of much thicker stratum
    B) It is a short duration test, hence does not give ultimate settlement
    C) For dense sandy soils bearing capacity of soil increases with size of foundation, but test gives conservative values because of the use of smaller plate
    D) For clayey soils bearing capacity of soil increases with size of foundation, but test gives conservative values because of the use of smaller plate

80. The piles that are used to anchor structures subjected to uplift are
A) Tension Piles
B) Compaction Piles
C) Sheet Piles
D) Fender Piles

81. Calculate the lag distance for a design speed of 60 kmph for a two way traffic on a two lane road. Take coefficient of friction as 0.36.
A) 150 m
B) 41.68 m
C) 39.3 m
D) 100 m

82. The number of vehicles moving in a specified direction on a given lane or roadway that pass a given point or cross section during specified unit of time is known as
A) Traffic capacity
B) Basic capacity
C) Traffic volume
D) Traffic density

83. Calculate the extra widening required for a pavement of width 7 m on a horizontal curve of radius 100 m, if the longest wheel base of vehicle expected on the road is 7 m. Design speed is 70 kmph.
A) 1.23
B) 0.87
C) 0.54
D) 1.52

84. Given below are two statements :
One is labelled as Assertion (A) and other is labelled as Reason (R).
Assertion (A) : Bridge abutment with straight wing walls is not suitable for bridge with waterway.
Reason (R) : Flowing water is likely to damage the embankment behind wing wall.
Choose the correct answer from the options given below :
A) Both (A) and (R) are true, and (R) is the correct explanation of (A)
B) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
C) (A) is true, but (R) is false
D) (A) is false, but (R) is true

85. In India, Gauge width in broad gauge is
A) 1.676 m
B) 1 m
C) 0.762 m
D) 0.610 m

86. In "adzing of sleepers", sleepers are laid at an inward slope of
A) 1 in 10
B) 1 in 15
C) 1 in 20
D) 1 in 25

87. Which of the following components provide access from runways to terminal area in an airport ?
A) Apron
B) Taxiway
C) Ramp
D) Hanger

88. Which of the following tunnel cross sectional shape is most suitable for highways and railways ?
A) Circular
B) Elliptical
C) Egg shaped
D) Horse Shoe shaped

89. Trains are received, sorted, and new trains are formed at a yard known as
A) Passenger yards
B) Goods yards
C) Marshalling yards
D) Locomotive yards

90. Which of the following statement/statements is/are true about Water Bound Macadem (WBM) roads ?
i. WBM roads shall not be used as a finished pavement surface under any circumstances.
ii. The coarse aggregate used in WBM base generally consists of crushed or broken stones.
iii. In WBM roads bitumen is used as binding material to prevent raveling of coarse aggregate.
iv. Screenings are used to fill the voids in between the coarse aggregate.
A) i and iii only B) ii and iv only C) i and ii only D) iii and iv only

91. The method of population forecasting that assumes 'percentage increase in population per decade' as constant is
A) Arithmetic increase method
B) Incremental increase method
C) Geometrical increase method
D) Logistic curve method

92. Plain sedimentation removes impurities primarily by
A) Chemical oxidation
B) Gravity settling
C) Biological action
D) Coagulation

93. The water supply distribution layout which provides the least reliability during fire breakout is
A) Tree system
B) Ring system
C) Interlaced System
D) Reticulation system

94. The corrosive nature of water in supply pipes can be reduced by
A) Lowering the pH of water
B) Increasing dissolved oxygen content of water
C) Increasing carbon dioxide content of water
D) Adding lime or powdered chalk

95. The method of water distribution in which the treated water is directly pumped into distribution mains without storing it anywhere is called
A) Pumping system
B) Gravity system
C) Combined gravity and pumping system
D) Pumping with storage system

96. The primary advantage of egg-shaped sewer sections compared to hydraulically equivalent circular sewer sections is
A) Greater hydraulic mean depth when running full
B) Lower hydraulic mean depth when running full
C) Higher hydraulic mean depth at smaller depth of flow
D) Reduced construction cost

97. Which among the following statements is true about separate sewerage system ?
A) Separate sewerage system leads to higher load on the treatment unit than a combined system
B) Separate sewerage system leads to lesser load on the treatment unit compared to a combined system
C) More foul and insanitary conditions may develop during floods than a combined system
D) Best suited for congested areas

98. In grit chambers, the flow velocity is controlled to
A) Settle organic solids also
B) Prevent settling of grit
C) Allow grit to settle while keeping organic matter in suspension
D) Remove dissolved solids

99. A flushing tank in a sewerage system is mainly used where
A) Self-cleansing velocity is not achieved
B) Excessive storm water enters sewer
C) Sewage velocity is excessively high
D) Ground water infiltration is high

100. The major gas produced during sludge digestion, which comprises 65-70% of sludge digestion gas is
A) Hydrogen Sulphide
B) Carbon dioxide
C) Ammonia
D) Methane