राष्ट्रीय प्रौद्योगिकी संस्थान वरंगल
वरंगल – 506004, तेलंगाना, भारत
NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL
WARANGAL – 506004, Telangana, INDIA

QUESTION BOOKLET – ADVANCED TEST FOR RECRUITMENT TO TECHNICAL CADRE POSTS

Post:	Technical Assistant
Department	Civil Engineering
Advt.:	01/2026 dated 09.01.2026
Date of Exam:	10-08-2026
Duration:	2 Hours
Total Marks:	200 (100 Q X 2 M each)
No. of Questions:	100 (MCQs)
Negative Marking:	1/4th mark for every wrong answer

INSTRUCTIONS TO THE CANDIDATES

1. This is an Advanced Test comprising 100 Multiple Choice Questions (MCQs), to be conducted in MCQ mode only.
2. The duration of the test is 2 hours.
3. Answers must be marked on the OMR Answer Sheet using a blue or black ballpoint pen only. Use of pencils is not permitted.
4. Candidates must write/mark their Roll Number, Post applied for, and other required details in the designated space on the OMR Answer Sheet.
5. Answers marked on the Question Booklet or on any sheet other than the OMR Answer Sheet will not be evaluated.
6. For each question, darken the circle corresponding to the correct answer completely and clearly on the OMR Answer Sheet.
7. Each question carries equal marks. There will be a negative marking of ¼ th mark for every wrong answer. No marks will be deducted for questions not attempted.
8. Mark only one answer for each question. Marking more than one circle for a question will be treated as a wrong answer.
9. Overwriting, cutting, or erasing that leaves the OMR Answer Sheet unclear may result in the answer not being evaluated.
10. No candidate shall leave the examination hall during the test.
11. Any attempt to copy, use unfair means, or communicate with others will result in immediate disqualification.
12. The use of electronic gadgets, calculators, mobile phones, smart watches, or any written/printed material is strictly prohibited.
13. Rough work, if any, should be done only on the separate sheet provided for the purpose.
14. Ensure that the OMR Answer Sheet is duly filled and handed over to the Invigilator before leaving the examination hall.
15. Failure to submit the OMR Answer Sheet will result in cancellation of candidature.
16. All material provided, including rough sheets, must be returned before leaving the examination hall.

1. Which of the following errors in chain surveying is cumulative and always positive?
   A) Error due to sag in the chain
   B) Error due to incorrect pull
   C) Error due to temperature variation
   D) Error due to improper alignment

2. In a prismatic compass, the graduated ring is attached to:
   A) The compass box and rotates with line of sight
   B) The magnetic needle and remains aligned with the magnetic meridian
   C) The sighting vane
   D) The tripod head

3. If the whole circle bearing (WCB) of a line is 245°30', its reduced bearing (RB) is:
   A) S 65°30' W
   B) N 65°30' W
   C) S 25°30' W
   D) N 25°30' E

4. In levelling, the correction for curvature (in meters) for a distance 'D' (in kilometers) is given by:
   A) $0.0785\ D^2$ (subtractive)
   B) $0.0673\ D^2$ (subtractive)
   C) $0.0112\ D^2$ (additive)
   D) $0.0785\ D^2$ (additive)

5. The line passing through the intersection of cross-hairs and the optical center of the objective is known as:
   A) Line of collimation
   B) Axis of telescope
   C) Bubble line
   D) Vertical axis

6. In transit theodolite, face left and face right observations are taken to eliminate:
   A) Error due to eccentricity of centers
   B) Index error of vertical circle
   C) Error due to non-perpendicularity of transit axis to vertical axis
   D) Both B and C

7. An Electro-Optical Distance Meter (EDM) in a Total Station measures distance by determining the:
   A) Phase shift of modulated infrared/laser carrier waves
   B) Time delay of audio frequency sound waves
   C) Angle subtended by a known target length
   D) Refractive index of atmospheric air

8. Contour lines that are closely spaced indicate:
   A) Gentle slope
   B) Steep slope
   C) Uniform slope
   D) Overhanging cliff

9. A series of closed contour lines with higher values inside represents a:
   A) Depression
   B) Hill
   C) Saddle
   D) Valley

10. In reciprocal levelling, which of the following errors are completely eliminated?
   A) Curvature error and collimation error
   B) Refraction error only
   C) Curvature, refraction, and collimation errors
   D) Collimation error only

11. As per IS 1077, the average compressive strength of a Class 10.0 burnt clay brick should not be less than:
   A) 7.5 N/mm^2
   B) 10.0 N/mm^2
   C) 12.5 N/mm^2
   D) 15.0 N/mm^2

12. High soundiness in cement due to free lime and magnesia is tested using:
   A) Vicat apparatus
   B) Le-Chatelier apparatus and Autoclave test
   C) Blaine's air permeability apparatus
   D) Briquette testing machine

13. Which Bogue's compound in cement is responsible for early strength development (within first 7 days)?
   A) Tricalcium Silicate (C3S)
   B) Dicalcium Silicate (C2S)
   C) Tricalcium Aluminate (C3A)
   D) Tetracalcium Aluminoferrite (C4AF)

14. Aggregate Impact Value (AIV) test measures which property of coarse aggregates?
   A) Hardness against abrasion
   B) Toughness against sudden shock/impact
   C) Resistance to crushing under static load
   D) Durability against weathering

15. Elongation index of an aggregate is defined as the percentage by weight of particles whose greatest dimension is greater than:
   A) 0.6 times their mean dimension
   B) 1.8 times their mean dimension
   C) 2.5 times their mean dimension
   D) 1.2 times their mean dimension

16. In TMT (Thermo-Mechanically Treated) steel bars, the cross-section consists of:
   A) Soft tempered martensite core and ductile ferrite-pearlite rim
   B) Hard tempered martensite outer rim and soft ductile ferrite-pearlite core
   C) Homogeneous high-carbon steel throughout
   D) Cold-twisted outer layer with un-worked inner core

17. According to IS 10262:2019, target mean strength (f'_{ck}) for concrete mix design is calculated as:
    A) $f'_{ck} = f_{ck} + 1.65s$
    B) $f'_{ck} = f_{ck} + 2.0s$
    C) $f'_{ck} = f_{ck} + 1.35s$
    D) $f'_{ck} = f_{ck} + 0.85s$

18. Bulking of sand is maximum at a moisture content of approximately:
    A) 2% to 3%
    B) 4% to 6%
    C) 10% to 12%
    D) 15% to 20%

19. Workability of fresh concrete with very low slump (less than 20 mm) is best determined by:
    A) Slump test
    B) Compacting factor test
    C) Vee-Bee consistometer test
    D) Flow table test

20. Efflorescence in bricks is caused by the presence of excess soluble salts of:
    A) Silica and Alumina
    B) Sodium and Potassium
    C) Iron oxide and Lime
    D) Magnesia and Carbonate

21. The relation between Young's Modulus (E), Bulk Modulus (K), and Poisson's Ratio (u) is:
    A) E = 2K(1 - 2u)
    B) E = 3K(1 - 2u)
    C) E = 3K(1 + 2u)
    D) E = 2K(1 + u)

22. Point of contraflexure in a beam is defined as the section where:
    A) Bending moment is maximum
    B) Shear force changes sign
    C) Bending moment changes sign or becomes zero
    D) Deflection is zero

23. For a simply supported beam of length (L) carrying a uniformly distributed load (UDL) of (w) per unit length, maximum bending moment is:
    A) $wL^2 / 4$
    B) $wL^2 / 8$
    C) $wL^2 / 12$
    D) $wL^2 / 2$

24. Maximum shear stress in a circular beam section of radius (R) subject to shear force (V) is:
A) 4/3 times the Average Shear Stress
B) 3/2 times the Average Shear Stress
C) 9/8 times the Average Shear Stress
D) 2 times the Average Shear Stress

25. Euler's crippling load for a column fixed at one end and hinged at the other end is given by (where 'L' is actual length):
A) $\pi^2 EI/L^2$
B) $2\pi^2 EI$ /L^2
C) $4\pi^2 EI/L^2$
D) $\pi^2 EI/4L^2$

26. Slenderness ratio of a compression member is defined as the ratio of:
A) Effective length to radius of gyration
B) Actual length to cross-sectional area
C) Moment of inertia to effective length
D) Radius of gyration to effective length

27. A plane truss with 'm' members and 'j' joints is statically determinate internally if:
A) m = 2j - 3
B) m = 3j - 2
C) m = 2j - 4
D) m = j - 3

28. Shape factor for a solid rectangular section of width 'b' and depth 'd' is:
A) 1.18
B) 1.50
C) 1.70
D) 2.00

29. Strain energy stored in a member subjected to pure axial tension 'P', length 'L', cross-section 'A', and Young's modulus 'E' is:
A) $\frac{P^2 L}{(AE)}$
B) $\frac{P^2 L}{(2AE)}$
C) $\frac{PL^2}{(2AE)}$
D) $\frac{P^2 L^2}{(2AE)}$

30. The principle of superposition is valid for structures made of materials that exhibit:
A) Non-linear elastoplastic behavior
B) Linear elastic behavior and small deformations
C) Purely plastic behavior
D) Viscoelastic behavior

31. In the Limit State of Collapse (Flexure) according to IS 456:2000, maximum compressive strain in concrete at the outermost fiber is taken as:
A) 0.002
B) 0.0035
C) 0.0045
D) 0.0015

32. Partial safety factor for concrete (γ_c) and steel (γ_s) in Limit State Design are taken as:
A) 1.5 and 1.15 respectively
B) 1.15 and 1.5 respectively
C) 1.5 and 1.5 respectively
D) 1.2 and 1.15 respectively

33. For Fe 415 grade steel, maximum depth of neutral axis (X_{umax}/d) in balanced section design is:
A) 0.53
B) 0.48
C) 0.46
D) 0.40

34. The minimum area of tension steel reinforcement in RC beam of width 'b' and effective depth 'd' using grade f_y is given by:
A) As / (bd) = 0.85 / f_y
B) As / (bd) = 0.4 / f_y
C) As / (bd) = 0.15 / f_y
D) As / (bd) = 0.002

35. Development length (L_d) of a deformed bar of diameter ϕ subjected to tension is directly proportional to:
A) Permissible shear stress (τ_c)
B) Design stress of bar (0.87f_y)
C) Square of bar diameter ϕ^2
D) Modulus of elasticity of concrete (Ec)

36. Nominal clear cover to main reinforcement for a RC column as per IS 456:2000 under moderate exposure conditions should not be less than:
A) 25 mm
B) 30 mm
C) 40 mm
D) 50 mm

37. Maximum area of tension reinforcement in a reinforced concrete beam section shall not exceed:
A) 2% of total cross-sectional area
B) 4% of total cross-sectional area
C) 6% of total cross-sectional area
D) 0.8% of total cross-sectional area

38. Side face reinforcement is provided in a RC beam when depth of the web exceeds:
A) 450 mm
B) 500 mm
C) 750 mm
D) 1000 mm

39. Minimum percentage of longitudinal reinforcement in a reinforced concrete column as per IS 456 is:
A) 0.6%
B) 0.8%
C) 1.0%
D) 1.2%

40. Shear reinforcement in a RC beam is primarily designed to resist:
A) Flexural compressive stresses
B) Diagonal tension stresses
C) Diagonal compression stresses
D) Bond stresses

41. Kinematic viscosity (ν) is related to dynamic viscosity (μ) and fluid density (ρ) by:
A) $\nu = \mu \times \rho$
B) $\nu = \frac{\mu}{\rho}$
C) $\nu = \frac{\rho}{\mu}$
D) $\nu = \frac{\mu^2}{\rho}$

42. Total pressure force on a vertically submerged plane area A with centroid at depth $\bar{h}$ from the free water surface is:
A) $P = wA\bar{h}$
B) $P = \frac{wA}{\bar{h}}$
C) $P = \frac{wI_G}{\bar{h}}$
D) $P = wA\bar{h}^2$

43. Bernoulli's equation is derived based on the assumption that fluid flow is:
A) Viscous, compressible, rotational, and steady
B) Inviscid, incompressible, irrotational, and steady along a streamline
C) Laminar, compressible, non-uniform, and unsteady
D) Turbulent, incompressible, rotational, and steady

44. Major head loss in pipe flow governed by Darcy-Weisbach equation ($h_f = \frac{fLV^2}{2gD}$) is inversely proportional to:
A) Length of pipe (L)
B) Square of velocity (V^2)
C) Diameter of pipe (D)
D) Friction factor (f)

45. Most economical trapezoidal open channel section has hydraulic radius equal to:
A) Half of water depth (y/2)
B) Water depth (y)
C) Two times water depth (2y)
D) One-third water depth (y/3)

46. Hydraulic jump in an open channel occurs when flow transitions from:
A) Subcritical to supercritical
B) Supercritical to subcritical
C) Critical to subcritical
D) Uniform to non-uniform subcritical

47. Hyetograph is a graphical representation of:
A) Runoff rate versus time
B) Cumulative rainfall versus time
C) Rainfall intensity versus time
D) Streamflow discharge versus stage

48. A unit hydrograph represents direct runoff resulting from unit depth (usually 1 cm) of rainfall excess duration over a catchment area uniformly at a:
A) Constant rate over specified duration
B) Linearly increasing rate
C) Exponentially decreasing rate
D) Variable rate proportional to slope

49. According to Lacey's regime theory, the silt factor (f) is related to the median grain size (d_{50} in mm) by:
A) $f = 1.76\sqrt{d_{50}}$
B) $f = 1.35\sqrt{d_{50}}$
C) $f = 2.0(d_{50})^{1/3}$
D) $f = 0.85(d_{50})^{2}$

50. Unconfined aquifer yield is expressed by which coefficient?
A) Storage coefficient / Specific yield
B) Coefficient of transmissivity only
C) Leakage factor
D) Porosity percentage only

51. As per IS 10500:2012, acceptable limit for total dissolved solids (TDS) in drinking water is:
A) 200 mg/L
B) 500 mg/L
C) 1000 mg/L
D) 2000 mg/L

52. Blue baby disease (Methaemoglobinaemia) in infants is caused by excess concentration of which ion in drinking water?
A) Fluoride (> 1.5 mg/L)
B) Nitrate (> 45 mg/L)
C) Iron (> 0.3 mg/L)
D) Lead (> 0.01 mg/L)

53. The dominant mechanism of particle removal in a rapid sand filter is:
A) Straining at top surface only
B) Depth filtration through straining, flocculation, and sedimentation
C) Biological oxidation layer (Schmutzdecke)
D) Chemical precipitation

54. Breakpoint chlorination refers to the point where added chlorine completely oxidizes:
A) All pathologically active bacteria
B) All organic matter and ammonia compounds, leaving free residual chlorine beyond this point
C) Heavy metal ions
D) Hardness-causing salts

55. Ratio of 5-day Biochemical Oxygen Demand (BOD_5 at 20°C) to Ultimate BOD (BOD_u) for domestic wastewater is approximately:
A) 0.68
B) 0.85
C) 0.50
D) 0.95

56. Self-cleansing velocity recommended for sewer lines in India to prevent deposition of solid matter is around:
A) 0.15 m/s to 0.30 m/s
B) 0.75 m/s to 1.0 m/s
C) 2.5 m/s to 3.0 m/s
D) 4.0 m/s to 5.0 m/s

57. Activated Sludge Process (ASP) is classified as an:
A) Attached growth aerobic process
B) Suspended growth aerobic process
C) Attached growth anaerobic process
D) Suspended growth anaerobic process

58. In a septic tank, digestion of settled sludge occurs by:
A) Aerobic bacteria
B) Anaerobic bacteria
C) Facultative algae
D) Chemical oxidation

59. Which air pollutant is primarily responsible for secondary photochemical smog formation?
A) Sulfur dioxide (SO_2)
B) Ground-level Ozone (O_3)
C) Carbon monoxide (CO)
D) Lead dust

60. The primary unit operation in sludge dewatering that uses centrifugal force is:
A) Thickening
B) Centrifugation
C) Incineration
D) Composting

61. Plasticity Index (PI) of a soil is defined as difference between:
A) Liquid Limit and Plastic Limit (LL - PL)
B) Plastic Limit and Shrinkage Limit (PL - SL)
C) Liquid Limit and Shrinkage Limit (LL - SL)
D) Natural Moisture Content and Plastic Limit

62. According to Unified Soil Classification System (USCS), soil designated as 'GW' represents:
A) Well-graded gravel
B) Poorly-graded gravel with clay
C) Well-graded sand
D) Gravelly silt

63. Ratio of volume of voids to total volume of soil mass is called:
A) Void ratio (e)
B) Porosity (η)
C) Degree of saturation (S)
D) Air content (a_c)

64. Functional relationship between void ratio (e), degree of saturation (S), specific gravity (G), and water content (w) is:
A) $eS = wG$
B) $ew = SG$
C) $eG = wS$
D) $Sw = e/G$

65. Effective stress in a saturated soil mass is defined as:
A) Total stress plus pore water pressure
B) Total stress minus pore water pressure
C) Pore water pressure only
D) Submerged unit weight multiplied by depth

66. Darcy's Law for flow of water through soil ($v = ki$) is valid under condition that flow is:
A) Laminar and Reynolds number is less than 1
B) Turbulent and high velocity
C) Transition flow in coarse gravel
D) Unsteady non-uniform flow

67. Terzaghi's ultimate bearing capacity equation for a continuous strip footing on c-ϕ soil is:
A) $q_u = 1.3cN_c + qN_q + 0.4\gamma BN_\gamma$
B) $q_u = cN_c + qN_q + 0.5\gamma BN_\gamma$
C) $q_u = 1.2cN_c + qN_q + 0.3\gamma BN_\gamma$
D) $q_u = cN_c + 1.3qN_q + 0.5\gamma BN_\gamma$

68. Negative skin friction in pile foundations occurs when surrounding soil:
A) Settles faster than the pile
B) Moves upward due to swelling
C) Has higher shear strength than pile material
D) Is subjected to lateral vibration

69. Standard Penetration Test (SPT) N-value is corrected for overburden pressure and dilatancy. Dilatancy correction is applied when:
A) $N_{60} > 15$in fine silty sand below water table
B) $N_{60} < 15$in dry coarse sand
C) Soil is soft organic clay
D) Testing depth is less than 1.5 m

70. Quick sand condition is a hydraulic phenomenon occurring when effective stress in soil becomes zero, which happens when hydraulic gradient (i) equals critical gradient (i_c):
A) $i_c = \frac{(G-1)}{(1+e)}$
B) $i_c = \frac{(G+1)}{(1+e)}$
C) $i_c = (G-1)e$
D) $i_c = \frac{(1+e)}{(G-1)}$

71. In detailed estimation of brickwork, deductions are NOT made for ends of lintels/rafters up to an area of:
A) 0.1 sq.m
B) 0.5 sq.m
C) 1.0 sq.m
D) 0.05 sq.m

72. Plinth area of a building includes:
A) Area of courtyard and light well
B) Area of walls at floor level
C) Cantilevered open balcony area
D) Plinth offset exceeding 5 cm

73. According to IS 1200, earthwork in excavation is measured in terms of:
A) Square meters (m^2)
B) Cubic meters (m^3)
C) Running meters (m)
D) Tonnes

74. Earnest Money Deposit (EMD) requested at time of tender submission is generally what percentage of estimated cost?
A) 1% to 2%
B) 5% to 10%
C) 15%
D) 0.1%

75. Security deposit deducted from contractor's running bills is retained by employer to ensure:
A) Satisfactory performance during defect liability period
B) Payment of sub-contractor wages
C) Purchase of high quality materials
D) Payment of local municipality taxes

76. In Item Rate Contract, payment to contractor is made on basis of:
A) Lump sum agreed amount regardless of variations
B) Actual quantities executed measured at quoted unit rates
C) Percentage above or below estimated cost
D) Cost of materials plus fixed percentage profit

77. Valuation method based on net income generated by a property capitalized at a suitable rate of interest is:
A) Rental method of valuation
B) Direct comparison method
C) Depreciation method
D) Development method

78. Sinking fund is created by setting aside periodic payments to accumulate a fund for:
A) Emergency repairs during operational phase
B) Rebuilding or replacing property at end of utility life
C) Paying annual property taxes
D) Covering unexpected contractor claims

79. Scrap value of a structure is defined as value of dismantled material at:
A) End of utility life after demolition
B) Beginning of construction
C) Mid-span of design life without demolition
D) Current market price without considering age

80. A 'Bill of Quantities' (BOQ) in tender documents contains detailed listing of:
A) Work items, estimated/quoted quantities, units, and rate columns
B) General safety rules only
C) Names and designations of project engineers
D) Architectural conceptual floor plans

81. As per IRC recommendations, maximum super-elevation provided on plain and rolling terrain highways is:
A) 4%
B) 7%
C) 10%
D) 12%

82. Stopping Sight Distance (SSD) depends on lag distance and braking distance. Formula for SSD on level grade is:

A) $SSD = vt + \frac{v^2}{2gf}$

B) $SSD = vt + \frac{v^2}{gf}$

C) $SSD = 2vt + \frac{v^2}{2gf}$

D) $SSD = vt^2 + \frac{v}{2gf}$

83. Standard reaction time (t) of driver assumed in IRC for SSD calculations is:

A) 1.5 seconds
B) 2.5 seconds
C) 3.5 seconds
D) 4.0 seconds

84. Extra widening required on horizontal curves consists of mechanical widening and psychological widening. Mechanical widening (W_m) for a road with $n$lanes and wheel base $l$on curve radius $R$is:

A) $W_m = \frac{nl^2}{(2R)}$

B) $W_m = \frac{nl}{(2R)}$

C) $W_m = \frac{V}{(9.5\sqrt{R})}$

D) $W_m = \frac{nl^2}{R}$

85. Ideal shape of a transition curve recommended by IRC for horizontal curves on highways is:

A) Circular arc
B) Cubic parabola
C) Spiral (Clothoid)
D) Lemniscate

86. Overtaking Sight Distance (OSD) for two-way traffic on a two-lane road is given by sum of distance components:

A) $d_1 + d_2$
B) $d_1 + d_2 + d_3$
C) $d_2 + d_3$
D) $2d_1 + d_2$

87. The rule used for highway development planning in India under Nagpur Road Plan (1943–1963) assumed network pattern based on:

A) Star and Grid pattern
B) Circular pattern
C) Hexagonal pattern
D) Linear corridor pattern

88. Ruling gradient recommended by IRC for plain and rolling terrain in India is:
A) 1 in 30 (3.3%)
B) 1 in 20 (5.0%)
C) 1 in 15 (6.7%)
D) 1 in 10 (10.0%)

89. Absolute minimum radius of horizontal curve (R_{min}) is given by equation:
A) $R_{min} = \frac{V^2}{127(e+f)}$
B) $R_{min} = \frac{V^2}{225(e+f)}$
C) $R_{min} = \frac{V^2}{127(e-f)}$
D) $R_{min} = \frac{V}{127(e+f)}$

90. Minimum camber provided for flexible pavements in heavy rainfall regions in India is:
A) 1 in 50 (2.0%)
B) 1 in 40 (2.5%)
C) 1 in 33 (3.0%)
D) 1 in 60 (1.7%)

91. In First Angle Projection system, object is placed in which quadrant relative to vertical and horizontal planes?
A) First Quadrant (Object between observer and plane)
B) Third Quadrant (Plane between observer and object)
C) Second Quadrant
D) Fourth Quadrant

92. In isometric projection, all three axes are inclined to each other at an angle of:
A) 90°
B) 120°
C) 135°
D) 60°

93. Ratio of isometric length to true length of an object in isometric drawing is approximately:
A) 0.816 (or $\sqrt{2/3}$)
B) 0.707
C) 0.866
D) 1.000

94. Representative Fraction (RF) of a scale 1 cm = 5 m is:
A) 1:5
B) 1:50
C) 1:500
D) 1:5000

95. Which type of line is used to represent hidden outlines and edges in engineering drawing?
A) Continuous thick line
B) Dashed narrow line (short dashes)
C) Chain thin line (dash-dot)
D) Continuous thin zig-zag line

96. In AutoCAD, shortcut command 'TR' is used for:
A) Track line
B) Trim geometry
C) Transform object
D) Triangle creation

97. Command used in AutoCAD to combine multiple entities into a single named block object is:
A) GROUP
B) BLOCK
C) JOIN
D) UNION

98. In CAD systems, absolute coordinate entry '(10, 20)' specifies point relative to:
A) Last picked point
B) World Coordinate System (WCS) origin (0,0)
C) Current viewport center
D) Screen top-left corner

99. Standard drawing sheet size for A1 format specified by BIS is:
A) 841 mm x 1189 mm
B) 594 mm x 841 mm
C) 420 mm x 594 mm
D) 297 mm x 420 mm

100. In CAD modeling, 'Fillet' command creates a:
A) Beveled sharp corner between two non-parallel lines
B) Rounded arc connection between two intersecting entities
C) Parallel offset line at specific distance
D) Tangent line between two circles

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