109/2026-E

Question Booklet Alpha Code: **A**

Question Booklet Serial Number: 151805

Total No. of questions : 100 Time : 75 Minutes

Maximum : 100 Marks

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 un-numbered, 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.

SEAL

109/2026-E

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. The total centre line length of walls (Refer Fig.1) is :

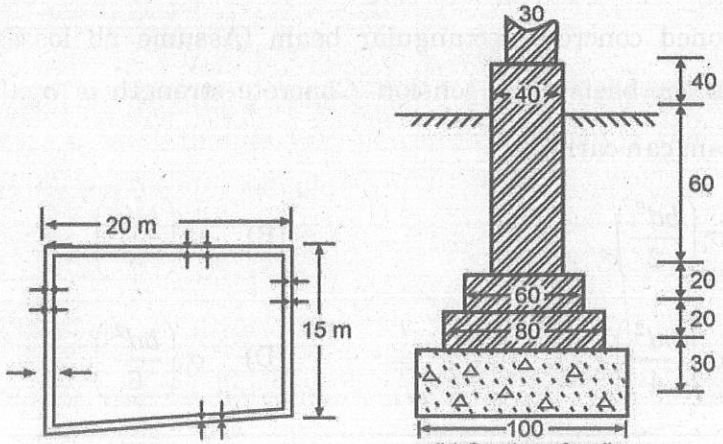

Fig. 1

(A) 66.5 m (B) 67.5 m

(C) 68.8 m (D) 70 m

2. An owner has installed an electronic gadget in his house at a cost of Rs. 50,000. If the life of the electronic gadget is 5 years, calculate the amount which he should set aside annually as Sinking fund to accumulate the cost at 10% compound interest (in Rs.) :

(A) 1638 (B) 1452

(C) 1534 (D) 1782

3. Match List I and List II and select the correct answer by using the codes given below the two lists.

List I (Unit of Measurement)	List II (Type of Work)
(a) Cubic metre	(1) Lead
(b) Square metre	(2) Cutting of Trees
(c) Numbers	(3) Surface dressing
(d) Metre	(4) Earthwork

(A) (a) – (1), (b) – (2), (c) – (3), (d) – (4)

(B) (a) – (3), (b) – (4), (c) – (2), (d) – (1)

(C) (a) – (4), (b) – (3), (c) – (2), (d) – (1)

(D) (a) – (2), (b) – (1), (c) – (4), (d) – (3)

4. Slenderness ratio of a column (having height 3 m and least radius of gyration 2 cm) is :

(A) 150 (B) 300

(C) 450 (D) 600

5. A pretensioned concrete rectangular beam (Assume no losses) (dimension $b \times d$) is designed on the basis of no tension. Concrete strength is σ_c. The maximum moment that the beam can carry is :

(A) $\sigma_c\left(\frac{bd^2}{2}\right)$ (B) $\sigma_c\left(\frac{bd^2}{3}\right)$

(C) $\sigma_c\left(\frac{bd^2}{4}\right)$ (D) $\sigma_c\left(\frac{bd^2}{6}\right)$

6. Ultimate strength of cement is provided by :

(A) Di Calcium Silicate (B) Tri Calcium Silicate

(C) Tri Calcium Aluminate (D) Tetra Calcium Alumino Ferrate

7. If 10 m is the length of the wall, 10 kN/m^2 is the allowable compressive strength and 30 kN is the weight on the wall, then the thickness of the brick wall is :

(A) 0.2 m (B) 0.30 m

(C) 0.40 m (D) 0.35 m

8. Using a sleeper density of $n + 5$, find the number of sleepers required for constructing a broad gauge railway track of 0.64 km length. [Assume the length of each rail on the broad gauge track as 12.80 m] :

(A) 600 (B) 700

(C) 800 (D) 900

9. The slenderness ratio of lacing bars under compression should not exceed :

(A) 125 (B) 65

(C) 135 (D) 145

10. The description of solid waste collected is as follows: Night soil (35 tonnes), Rubbish (50 tonnes), Debris (25 tonnes) and Garbage (40 tonnes). The organic solids in the above composition is :

(A) 35 t (B) 60 t

(C) 75 t (D) 85 t

11. A 12.5 mL of treated wastewater requires 187.5 mL of odour-free distilled water to reduce the odour to a level that is just perceptible. What is the Threshold Odour Number (TON) for the wastewater sample?

(A) 15 (B) 16

(C) 17 (D) 18

12. The liquid limit, plastic limit, water content, specific gravity and degree of saturation of a soil sample are respectively, 65%, 25%, 35%, 2.70 and 100%. The bulk density of the given soil sample is (assume density of water 1 g/mL) :

(A) 0.874 g/mL (B) 1.874 g/mL

(C) 2.874 g/mL (D) 3.874 g/mL

13. Ordinates of a 1-hour unit hydrograph at 1 hour intervals, starting from time $t = 0$, are 0, 2, 6, 4, 2, 1 and 0 m^3/s. Catchment area represented by this unit hydrograph are :

(A) 1.0 km^2 (B) 2.0 km^2

(C) 3.2 km^2 (D) 5.4 km^2

14. Consider the following surveys :

(1) Reconnaissance Survey

(2) Preliminary Survey

(3) Traffic Survey

(4) Location Survey

The correct sequence in which these surveys are conducted before the alignment of a track is finalised is :

(A) (1), (3), (2), (4) (B) (1), (3), (4), (2)

(C) (3), (1), (4), (2) (D) (3), (1), (2), (4)

15. If the modulus of elasticity of wood is 4×10^4 N/mm^2 and modulus of elasticity of steel is 2×10^5 N/mm^2, then the modular ratio is :

(A) 0.20 (B) 1.0

(C) 5.0 (D) 10

16. For Modified Proctor Test, which of the following is true?

(A) 25 blows, 3 layers, free fall 310 mm

(B) 25 blows, 5 layers, free fall 310 mm

(C) 25 blows, 3 layers, free fall 450 mm

(D) 25 blows, 5 layers, free fall 450 mm

17. The convexity given to the curved cross section of a carriage way, between the crown and the edge of the carriage way is known as :

(A) Camber (B) Gutter

(C) Ramp (D) Summit

18. According to the Indian Road Congress specification, the maximum width of a road vehicle is :

(A) 1.75 m (B) 2.00 m

(C) 2.25 m (D) 2.50 m

19. If the characteristics cube strength of concrete is 4 N/mm^2, then the modulus of elasticity for structural concrete (in N/mm^2) is :

(A) 5,700 (B) 11,400

(C) 22,800 (D) 32,800

20. The base period of a crop is 120 days. When its duty is 864 hectares/cumecs on the field, its delta is :

(A) 6 cm (B) 60 cm

(C) 12 cm (D) 120 cm

21. If an element is subjected to pure shearing stress q, then the maximum principal stress equals:

(A) q (B) $2q$

(C) $\frac{q}{2}$ (D) $q\sqrt{2}$

22. If the volume of hall is 100 m^3 and the total sound absorption is 16 m^3/s then the reverberation time in seconds is :

(A) 1 (B) 3

(C) 5 (D) 6.1

23. If the gross bearing capacity of a strip footing 1.5 m wide located at a depth of 1 m in clay is 400 kN/m^2, its net bearing capacity is (assume unit weight of foundation soil 20 kN/m^3) :

(A) 360 kN/m^2 (B) 370 kN/m^2

(C) 380 kN/m^2 (D) 390 kN/m^2

24. Coefficient of consolidation is expressed in terms of :

(A) cm^2/s (B) cm/s

(C) cm^2/N (D) $cm^2/N/s$

25. If the degree of Saturation of soil is 60%, water content is 0.20 and specific gravity 2.6, then the void ratio of the soil sample is :

(A) 0.67 (B) 0.77

(C) 0.87 (D) 0.97

26. The value of critical hydraulic gradient is : (given specific gravity = 2.6 and void ratio = 0.40) :

(A) 1.0 (B) 1.14

(C) 1.24 (D) 1.44

27. The coefficient of volume change is determined by the formula [where a_v = coefficient of compressibility and e_0 = void ratio] :

(A) $\frac{a_v}{1+e_0}$ (B) $\frac{1+e_0}{a_v}$

(C) $\frac{a_v}{1-e_0}$ (D) $\frac{1-e_0}{a_v}$

28. A moist soil sample of volume 60 cc weighs 108 g and its dried weight is 86.4 g. If its absolute density is 2.52 the degree of saturation is :

(A) 54% (B) 64%

(C) 74% (D) 84%

29. Pick the odd man out from the following :

(A) Well cap (B) Cutting edge

(C) Steining (D) Scour depth

30. Initial dissolved oxygen and the 5th day dissolved oxygen of a wastewater sample is 8 mg/L and 5 mg/L respectively (5 ml of the wastewater sample was taken in the BOD bottle). Calculate the 5th day BOD :

(A) 120 mg/L (B) 150 mg/L

(C) 180 mg/L (D) 210 mg/L

31. The maximum strain in concrete at the outermost compression fibre in the limit state method of design of a flexural member according to IS 456 is :

(A) 0.0025 (B) 0.0035

(C) 0.0045 (D) 0.0055

32. The detention time for a rectangular sedimentation tank of length 20 m, width 9 m and depth 1m having a discharge of 1 cumecs is :

(A) 1 minute (B) 2 minutes

(C) 3 minutes (D) 4 minutes

33. In a simply supported reinforced concrete beam, the reinforcement is placed :

(A) Below the neutral axis (B) Above the neutral axis

(C) At the neutral axis (D) Any one of these

34. If the 90% volume of iceberg is immersed in water and only 10% is above the water surface, what is the density of iceberg in kg/m^3, if the density of seawater is 1025 kg/m^3?

(A) 900 (B) 922.5

(C) 950 (D) 1000

35. The factor of safety due to the sliding of retaining wall is generally taken as :

(A) 1.0 (B) 1.5

(C) 2.0 (D) 2.5

36. According to Terzaghi and Pack, which of the following soils in their natural form have the maximum porosity :

(A) Loose uniform sand (B) Stiff glacial clay

(C) Soft organic clay (D) Soft bentonite

37. Which of the following IS Code gives the equation for the net ultimate bearing capacity?

(A) IS 6400 (B) IS 6401

(C) IS 6402 (D) IS 6403

38. If L is the length of the column hinged at both ends, and EI is the flexural rigidity, then critical load is given by :

(A) $\pi^2 EI / L^2$ (B) $\pi^2 EI / 2L^2$

(C) $\pi^2 EI / 3L^2$ (D) $\pi^2 EI / 4L^2$

39. If h is the difference in elevation between two points A and B having sloping distance (L), Then the slope correction is expressed as :

(A) $h^2/2L$ (B) $h^2/4L$

(C) $h^2/8L$ (D) $h^2/24L$

40. If 5 km is the distance between two points, then the curvature correction in metres is :

(A) 0.963 (B) 1.963

(C) 2.963 (D) 3.963

41. The ratio of friction factor and coefficient of friction used in the general equation for determining head loss in a pipe is :

(A) 0.25 (B) 0.50

(C) 2.0 (D) 4.0

42. Find the relative compaction, if dry density in the field is 1.5 g/mL and maximum dry density in the laboratory is 2g/mL :

(A) 25% (B) 50%

(C) 75% (D) 100%

43. A document containing detailed description of all the items of work (but their quantities not mentioned) together with their current rates is called :

(A) Tender (B) Schedule of rates

(C) Analysis of rates (D) Abstract estimate

44. The imaginary line passing through the intersection of cross hairs and the optical centre of the objective is known as :

(A) Axis of the telescope (B) Line of collimation

(C) Axis of bubble tube (D) None of these

45. In the case of a building sold without demolishing it or dismantling it to places, the amount realised is called :

(A) Salvage value
(B) Market value
(C) Book value
(D) Scrap value

46. Which of the following IS Code specifies that all foundations should extend to a depth of atleast 50 cm below the natural ground surface :

(A) IS 1903
(B) IS 1904
(C) IS 1905
(D) IS 1906

47. The stresses at corner due to wheel load and warping are 1.9 MPa and 1.23 MPa respectively in winter. The critical stress (in MPa) will be :

(A) 0.57
(B) 1.23
(C) 2.12
(D) 3.03

48. The propped end of a cantilever beam of span L settles by an amount Δ, the rotation of the propped end is :

(A) Δ/L
(B) $1.5\ \Delta/L$
(C) $2\Delta/L$
(D) Zero

49. Reduction coefficient of a reinforced concrete column with an effective length of 4.8 m and size 250 mm $\times$ 300 mm is :

(A) 0.70
(B) 0.80
(C) 0.85
(D) 0.95

50. In a truss girder of a bridge, a diagonal consists of mild steel flat 400 ISF and carries a pull of 800 kN. If gross diameter of the rivets is 26 mm, then number of rivets required in the splice is :

(A) 9
(B) 8
(C) 7
(D) 6

51. The core of an eccentrically loaded column of a rectangular section is :

(A) Rectangle (B) Circle

(C) Parallelogram (D) Rhombus

52. A sewage treatment plant treats 10,000 m^3/day of wastewater having a BOD_5 of 300 mg/L. If 90% BOD removal is achieved, what is the BOD of the effluent?

(A) 270 mg/L (B) 30 mg/L

(C) 90 mg/L (D) 60 mg/L

53. An outlet irrigates an area of 20ha. The discharge (litres /sec) required at this outlet to meet the evapotranspiration requirement of 20mm occurring uniformly in 20 days neglecting other field losses is :

(A) 2.52 (B) 2.31

(C) 2.01 (D) 1.52

54. If 100 m and 50 m are the flying height and height of the terrain above MSL and 2 m is the focal length of the camera lens, then scale of the photograph is :

(A) 1/10 (B) 1/15

(C) 1/20 (D) 1/25

55. A stable channel is to be designed for a discharge of Q m^3/s with silt factor f as per Lacey's method. The mean flow velocity (m/s) in the channel is :

(A) $(Qf^2/140)^{1/6}$ (B) $(Qf^2/140)^{1/3}$

(C) $(Q^2f^2/140)^{1/6}$ (D) $0.48(Q/f)^{1/3}$

56. The angle between the observer's meridian and the declination circle of the celestial body is known as

(A) Azimuth (B) Altitude

(C) Right Ascension (D) Hour Angle

57. The height of water column corresponding to a pressure equivalent of 70 cm of mercury column is :

(A) 8.5 m (B) 9.0 m

(C) 9.5 m (D) 10.0 m

58. The percentage of residue left after sieving good Portland cement in 90 microns, Indian Standard sieve should not exceed :

(A) 5 (B) 10

(C) 15 (D) 20

59. A solid circular shaft of diameter d and length L is fixed at one end and free at the other end. A torque T is applied at the free end. The shear modulus of the material is G. Then the angle of twist at the free end is :

(A) $\frac{32TL}{\pi d^4 G}$ (B) $\frac{64TL}{\pi d^4 G}$

(C) $\frac{128TL}{\pi d^4 G}$ (D) $\frac{16TL}{\pi d^4 G}$

60. The optimum depth of kor-watering for wheat is :

(A) 9.5 cm (B) 13.5 cm

(C) 16.5 cm (D) 19 cm

61. The equation for determining flood discharge (Q) as per Ryves formulae is [where C = flood coefficient and A = area of basin in sq.km] :

(A) $Q = CA^{2/3}$ (B) $Q = CA^{3/4}$

(C) $Q = CA^{3/2}$ (D) $Q = CA^{4/3}$

62. If the bulk density of a soil sample is 2.3 g/mL and moisture content 10%, the value of dry density is :

(A) 1.1g/mL (B) 2.1g/mL

(C) 3.1g/mL (D) 4.1g/mL

63. In an unconfined compression test, if 100 kN is the axial load and the area of cross section is 100 m^2 then the deviator stress is :

(A) 0.5 kN/m^2 (B) 1.0 kN/m^2

(C) 1.5 kN/m^2 (D) 2.0 kN/m^2

64. Chlorine usage in the treatment of 20,000 cubic metre per day is 8 kg/day. The residual after 10 min. contact is 0.20 mg/L. The dosage in milligrams per litre will be :

(A) 0.4 (B) 0.5

(C) 0.6 (D) 0.8

65. If the difference between last reduced level and first reduced level = 0.08m and the sum of all the foresight reading is 7.395m, then the sum of all the backsight reading is :

(A) 7.275 m (B) 7.375 m

(C) 7.475 m (D) 7.575 m

66. A mild - sloped channel is followed by a steep- sloped channel. The profiles of gradually varied flow in the channel are :

(A) M_3, S_2 (B) M_3, S_3

(C) M_2, S_1 (D) M_2, S_2

67. Which of the following is true about Aileron?

(A) Controls pitching of aircraft (B) Controls yawing of aircraft

(C) is fixed on the wing (D) is fixed at the tail end of fuselage

68. The minimum stopping distance for vehicles moving on road with a design speed of 80 kmph is :

(A) 80 m (B) 100 m

(C) 120 m (D) 140 m

69. The rate of rise or fall of the road surface along its length is called :

(A) gradient (B) superelevation

(C) banking (D) cant

70. A cantilever beam of length 5 m carries a UDL of 100N/m throughout its length. The maximum bending moment in the beam will be :

(A) 250 Nm (B) 500 Nm

(C) 1250 Nm (D) 1500 Nm

71. According to Indian Road Congress specifications, the Passenger Care Unit (PCU) for a passenger car is :

(A) 1 (B) 2

(C) 3 (D) 4

72. A highway of 7. 8 m width is to be constructed in a place. If the proposed camber value is 1 in 50, what should be the height of crown with respect to the edges?

(A) 0.078 cm (B) 16.0 cm

(C) 0.156 cm (D) 7.8 cm

73. The theoretical oxygen required for complete oxidation 1 gram of glucose into carbon dioxide and water is :

(A) $\frac{45}{48}$ (B) $\frac{48}{45}$

(C) $\frac{192}{120}$ (D) $\frac{120}{180}$

74. The minimum number of longitudinal bars to be provided in circular column is :

(A) 4 (B) 6

(C) 8 (D) 10

75. The acceptable limit of iron in drinking water as per IS 10500:2012 (including its latest amendments) in mg/L :

(A) 0.1 (B) 0.3

(C) 0.6 (D) 1.0

76. Due to rise in temperature, the viscosity and unit weight of percolating fluid are reduced to 70% and 90% respectively. Other things being constant, the change in coefficient of permeability will be :

(A) 20.0% (B) 28.6%

(C) 63.0% (D) 77.8%

77. The method of increasing soil density by reducing the soil pore space by means of air expulsion is known as:

(A) soil exploration
(B) soil stabilization
(C) soil consolidation
(D) soil compaction

78. Maximum cant deficiency prescribed in Indian broad gauge railway track is:

(A) 40 mm
(B) 80 mm
(C) 100 mm
(D) 120 mm

79. The optimistic time, pessimistic time and most probable time to carry out a construction activity are 25 days, 48 days and 35 days respectively. Then the expected time to perform this activity is (in days):

(A) 35.5
(B) 36.5
(C) 37.5
(D) 38.5

80. The work done by the pump to lift $0.1 m^3/s$ of water to a height of 10 m is (Neglect frictional loss and other losses and assume the value of unit weight of water as $10 kN/m^3$):

(A) 0.1 kW
(B) 1 kW
(C) 10 KW
(D) 100 kW

81. Maximum principal stress theory for the failure of a material at elastic point is known as:

(A) Guest's or Treca's theory
(B) St. Venant's theory
(C) Rankine's theory
(D) Von Mises theory

82. If the velocity of flow is 1m/s then the loss of head at the entrance of the pipe is (acceleration due to gravity may be assumed as $10 m/s^2$):

(A) 0.20 m
(B) 0.25 m
(C) 0.50 m
(D) 0.75 m

83. Choose the odd one out of the following choices:

(A) Pre-tensioning
(B) Freyssinet system
(C) Magnet blaton system
(D) Gifford Udal system

84. The top diameter, bottom diameter and the height of a slump mould are respectively:

(A) 15 cm, 20 cm and 30 cm
(B) 10 cm, 15 cm and 30 cm
(C) 10 cm, 20 cm and 40 cm
(D) 10 cm, 20 cm and 30 cm

85. Gantry girders are designed to resist:

(A) lateral load

(B) longitudinal load

(C) lateral and longitudinal loads

(D) lateral, longitudinal and vertical loads

86. The ratio between fully plastic moment and yield moment of a rectangular section in flexure is:

(A) 1.0 (B) 1.5

(C) 2.0 (D) 2.5

87. In Standard Penetration Test, the sampler is driven into the soil by a drop hammer of weight:

(A) 43.5 kg (B) 53.5 kg

(C) 63.5 kg (D) 73.5 kg

88. Damp proof course is measured in terms of :

(A) m (B) m^2

(C) m^3 (D) none of these

89. The expenses of items which do not come under any regular head of items and the cost of unforeseen items are called:

(A) lumpsum (B) extras

(C) customary charges (D) contingencies

90. The value pH = 3 when compared to pH = 5 will be more acidic by:

(A) 2 times (B) 20 times

(C) 100 times (D) 200 times

91. The results of consolidation test on a sample of clay having thickness of 19 mm indicate that half the ultimate compression occurs in the first 5 minutes. Under similar drainage conditions, the time required for a building on 3.65m layer of the same clay to experience half of its final settlement will be:

(A) 16 days (B) 32 days

(C) 64 days (D) 128 days

92. If 30 m is the true length of the chain and 30.5 metre is the faulty length of the chain, then the true area of the plot is (If the measured area of the plot is $1000m^2$):

(A) 933 m^2 (B) 1033.6 m^2

(C) 1066.7 m^2 (D) 1087.7 m^2

93. The horizontal angle between the celestial body and the pole, at the observer's place is known as:

(A) Right ascension
(B) Hour angle
(C) Declination
(D) Azimuth

94. According to IS 399-1963, the weight of the timber is specified at (in terms of moisture content):

(A) 8%
(B) 10%
(C) 12%
(D) 14%

95. For a circular channel having diameter 1m, Kennedy's critical velocity is:

(A) 0.25 m/s
(B) 0.35 m/s
(C) 0.45 m/s
(D) 0.55 m/s

96. The phreatic line for an earth dam is:

(A) Parabolic
(B) Elliptical
(C) Circular
(D) Linear

97. The ratio of the mean supply (discharge) to the full supply (discharge) of a canal is:

(A) Time factor
(B) Capacity factor
(C) Kennedy factor
(D) Lacey's factor

98. The coagulant used in water treatment process when the pH of the water sample is in the range 4 to 7 is:

(A) Chlorinated Copperas
(B) Copperas
(C) Lime
(D) Alum

99. If the design speed is 80 kmph, reaction time is 2.5 seconds and the coefficient of friction is 0.50, the safe stopping distance is:

(A) 106 m
(B) 116 m
(C) 126 m
(D) 146 m

100. The top width and the depth of flow in a triangular channel were measured as 4 m and 1 m, respectively. The measured velocities on the centre line at the water surface, 0.2m and 0.8m below the surface are 0.7m/s, 0.6m/s, and 0.4 m/s, respectively. Using two – point method of velocity measurement, the discharge (in m^3/s) in the channel is:

(A) 1.4
(B) 1.2
(C) 1.0
(D) 0.8