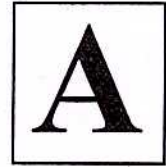


DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.

TR/TES/M/Civil-II/DIP-Gr-II/2026

Test Booklet Series

**TEST BOOKLET
CIVIL ENGINEERING
PAPER – II**



(Signature of the Candidate)

(Invigilator's Signature)

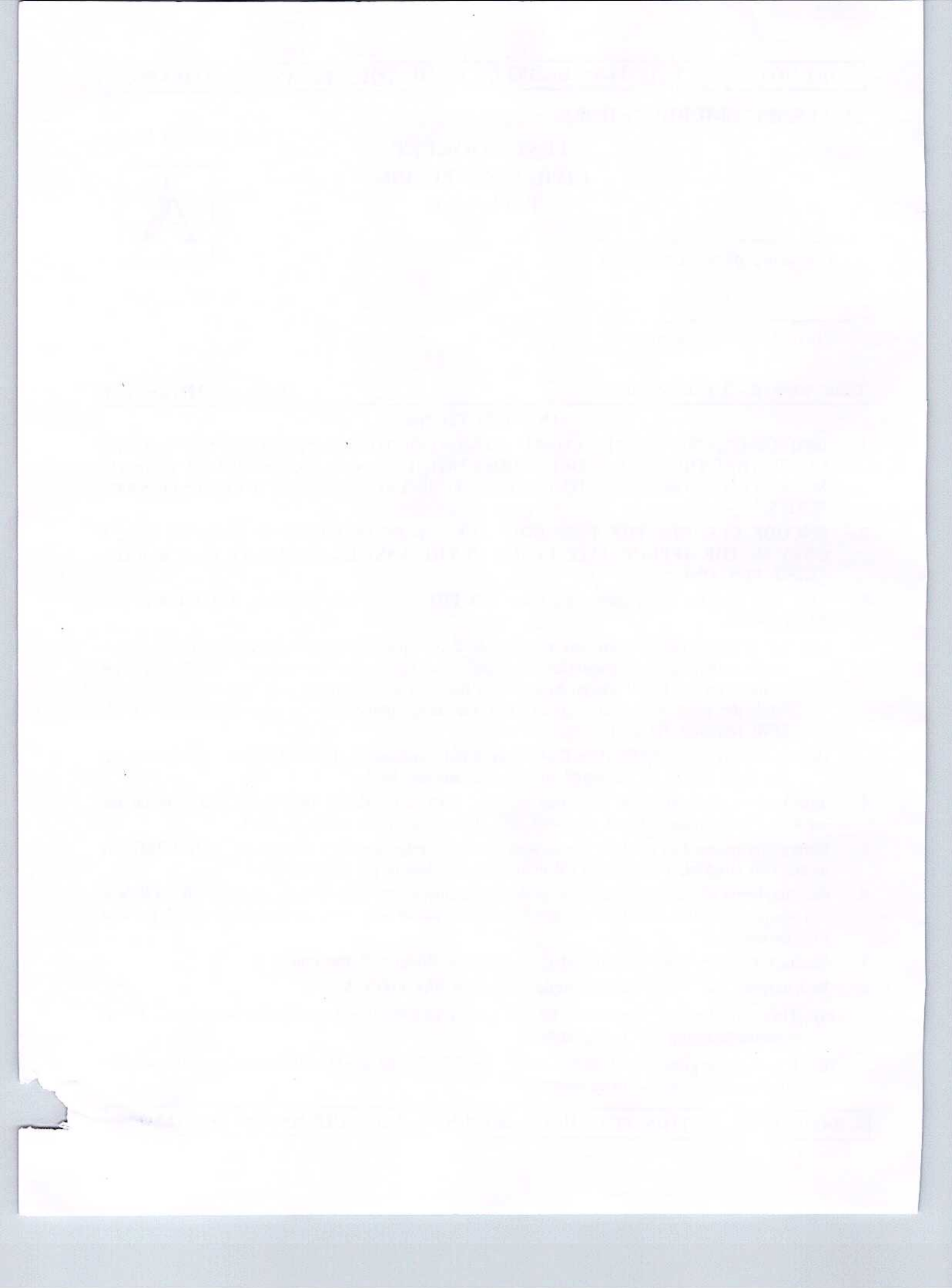
Time Allowed – 3 (Three) hours

Maximum Marks – 200

INSTRUCTIONS

1. IMMEDIATELY BEFORE THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY TEST BOOKLET OF SAME SERIES.
2. **ENCODE CLEARLY THE TEST BOOKLET SERIES IN THE OMR ANSWER SHEET ONLY IN THE APPROPRIATE PLACE IN THE ANSWER SHEET BY BLACK BALL POINT PEN ONLY.**
3. This Test Booklet is divided into three **SECTIONS** i.e., **SECTION-A**, **SECTION-B** and **SECTION-C**.
 - (A) **SECTION-A (MCQ Pattern)** contains 40 items (questions). Each question, carrying 2(two) marks only, has four responses (answers). You will select the response which you want to mark on the **OMR Sheet**. In case you feel that there is more than one correct response, mark the response which you consider the most appropriate. In any case choose **ONLY ONE** response for each item.
 - (B) Questions under **SECTION-B (Conventional Method)** and **SECTION-C (Conventional Method)** are to be answered in separate answer book.
4. You have to mark all your responses of **SECTION-A** by **Black Ball Point pen only** on the separate OMR Answer Sheet provided. See directions in the Answer Sheet.
5. Before you proceed to mark in the Answer Sheet the responses to various items of **SECTION-A** in the Text Booklet, you have to fill in some particulars in the Answer Sheet.
6. On completion of the Examination, you should handover the OMR Answer Sheet for **SECTION-A** and Answer Book for **SECTION-B** and **C** to the invigilator only. You are permitted to take the Test Booklet with you.
7. Sheets for rough work are appended on the Test Booklet at the end.
8. **Instructions for wrong and multiple answer(s) SECTION-A :**
 - (a) There will be four alternatives for the answer to every question. However there will be no negative marking for wrong answer.
 - (b) If a candidate gives more than one answer, it will be treated as a **Wrong Answer** even if one of the given answers happens to be correct.

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SECTION – A

- Answer *all* questions. Each question carries 2 marks. 2×40=80

(Question No. 1 to 40)

- Choose the correct answer from the four alternatives provided with each question and mark on the OMR Sheet.

Example : Poise is the unit of

- | | |
|------------------------------|-------------------------|
| (A) Surface tension | (B) Buoyant force |
| (C) Coefficient of viscosity | (D) Gravitational force |

Answer : (C) Coefficient of viscosity.

1. The variation in the volume of a liquid with the variation of pressure is called its
(A) Surface tension (B) Compressibility
(C) Capillarity (D) Viscosity
2. The loss of head at exit of a pipe is
(A) $(v^2/2g)$ (B) $(0.5 v^2/2g)$
(C) $(0.375 v^2/2g)$ (D) $(0.75 v^2/2g)$
3. The flow in a pipe is turbulent when Reynold number is
(A) Less than 2000 (B) Between 2000 and 2800
(C) More than 2800 (D) None of these

4. The relation between duty (D) in hectares/cumec, delta (Δ) in metres and base period (B) in days is

(A) $\Delta = \frac{8.64B}{D}$

(B) $\Delta = \frac{86.4B}{D}$

(C) $\Delta = \frac{864B}{D}$

(D) $\Delta = \frac{8640B}{D}$

5. The borrow pits should preferably, be taken from

(A) The field on the right side of the canal

(B) The field on the left side of the canal

(C) The centre half width of the section of the canal

(D) None of these

6. The Lacey's silt factor (f) is equal to

(A) $\frac{3V^2}{2R}$

(B) $\frac{5V^2}{2R}$

(C) $\frac{7V^2}{2R}$

(D) $\frac{9V^2}{2R}$

7. The curvature of earth is taken into consideration if the limit of survey is

(A) 50 to 100 km²

(B) 100 to 200 km²

(C) 200 to 250 km²

(D) More than 250 km²

8. When 1 cm on a map represents 10m on the ground, the representative fraction of the scale is

(A) 1/10

(B) 1/100

(C) 1/1000

(D) 1/10000

9. When a tape of length (L) and weight (w) N/m is stretched at its ends with a pull (P) N, then the correction for sag required is_____.

(A) $\frac{w.L}{24P}$

(B) $\frac{w^2.L^2}{24P^2}$

(C) $\frac{w^3.L^3}{24P^3}$

(D) $\frac{w^4.L^4}{24P^4}$

10. An imaginary line lying throughout the surface of ground and preserving a constant inclination to the horizontal is known as

(A) Contour line

(B) Horizontal equivalent

(C) Contour interval

(D) Contour gradient

11. Which of the following methods of plane table surveying is used to locate the position of an inaccessible point ?

(A) Radiation

(B) Intersection

(C) Traversing

(D) Resection

12. The most common cause of acidity in water is

(A) Carbon dioxide

(B) Oxygen

(C) Hydrogen

(D) Nitrogen

13. If the sewage contains grease and fatty oils, these are removed in

(A) Grit chambers

(B) Detritus tanks

(C) Skimming tanks

(D) Sedimentation tanks

14. Select the primary air pollutants among the following
- (A) Sulphur dioxide and nitrogen oxide
 - (B) Ozone and carbon monoxide
 - (C) Sulphur dioxide and ozone
 - (D) Nitrogen oxide and ozone
15. Dechlorination of water is achieved by adding
- (A) Sodium thiosulphate
 - (B) Sodium sulphate
 - (C) Sodium hexametaphosphate
 - (D) Sodium bisulphate
16. The main function of a fish plate is
- (A) To join the two rails together
 - (B) To join rails with the sleeper
 - (C) To allow rail to expand and contract freely
 - (D) None of these
17. The equilibrium superelevation to be provided on a curve of radius R metres and speed of vehicle V kmph is given by
- | | |
|-------------------------|-------------------------|
| (A) $\frac{GV^2}{127R}$ | (B) $\frac{GV^2}{160R}$ |
| (C) $\frac{GV^2}{147R}$ | (D) $\frac{GV^2}{217R}$ |

Where G is gauge.

18. For a railway track in hilly terrain, the type of gradient provided is
- (A) Pulling gradient (B) Momentum gradient
(C) Helper gradient (D) Minimum gradient
19. Los Angeles testing machine is used to conduct
- (A) Abrasion test (B) Impact test
(C) Attrition test (D) Crushing strength test.
20. The metacentric height of two floating bodies A and B are 1m and 1.5m respectively. Select the correct statement.
- (A) The bodies A and B have equal stability
(B) The body A is more stable than body B
(C) The body B is more stable than body A
(D) The bodies A and B are unstable
21. A flow whose streamline is represented by a curve, is called
- (A) One-dimensional flow (B) Two-dimensional flow
(C) Three-dimensional flow (D) Four-dimensional flow
22. The discharge over a rectangular notch is
- (A) $\frac{2}{3} C_d \cdot b \sqrt{2gH}$ (B) $\frac{2}{3} C_d \cdot b \sqrt{2g} H$
(C) $\frac{2}{3} C_d \cdot b \sqrt{2g} H^{\frac{3}{2}}$ (D) $\frac{2}{3} C_d \cdot b \sqrt{2g} H^2$

Where C_d is the co-efficient of discharge passing over the rectangular notch.
 b is the width of the flume in which rectangular notch is fitted.
 H is the head over the rectangular notch.
 g is the acceleration due to gravity.

23. The following recording rain-gauge does not produce the mass curve of precipitation as record
- (A) Symon's Raingauge
 - (B) Tripping Bucket Raingauge
 - (C) Weighing-Bucket Type Raingauge
 - (D) Natural Syphon Gauge
24. The Instantaneous Unit Hydrograph (IUH) is a hydrograph of
- (A) unit duration and infinitely small rainfall excess
 - (B) infinitely small duration and of unit rainfall excess
 - (C) infinitely small duration and of unit rainfall excess of infinitely small area
 - (D) unit rainfall excess of infinitely small area
25. Identify the incorrect statement : The possible Gradually Varied Profiles (GVF) in
- (A) mild slope channels are M1, M2, and M3
 - (B) adverse slope channels are A2 and A3
 - (C) horizontal channels are H1 and H3
 - (D) critical slope channels are C1 and C3
26. Which method of forecasting population combines both arithmetic and geometric increase methods ?
- (A) Ratio and correlation method
 - (B) Growth composition analysis method
 - (C) Incremental increase method
 - (D) Zoning method

27. What is Hazen - Williams formula for pipe flow

- (A) $V = 0.849 CR^{0.33} S^{0.54}$ (B) $V = 0.849 CR^{0.59} S^{0.63}$
(C) $V = 0.849 CR^{0.63} S^{0.54}$ (D) $V = 0.849 CR^{0.33} S^{0.33}$

Where V is mean velocity of flow in pipe (m/sec)

R is hydraulic radius (m)

S is hydraulic gradient

C is co-efficient of roughness of pipe

28. The detention period for grit chamber for waste water treatment may vary from

- (A) 30 to 60 seconds (B) 40 to 90 seconds
(C) 90 to 120 seconds (D) 120 to 180 seconds

29. The total subsurface soil area required for the soak pit for final purification of the effluent from septic tank is given by the empirical formula

- (A) $Q = 130(t)^{1/2}$ (B) $Q = 130 t$
(C) $Q = 130/(t)^{1/2}$ (D) $Q = 130/t$

Where Q is maximum rate of effluent application in litre per day (lpd) / square meter of leaching surface t is standard percolation rate for the soil in minutes per centimeter.

30. From the cumulative speed distribution for a highway design, the design accuracy is checked at what percentile ?

- (A) 85 percentile (B) 90 percentile
(C) 95 percentile (D) 98 percentile

31. If N is the algebraic difference in grades, S is the maximum sight distance in metres, the length of the summit curve is
- (A) $NS/4.4$ (B) $NS^2/4.4$
(C) $(NS)^2/4.4$ (D) $N^2/4.4$
32. If ' V ' is the speed in Km/h and ' S ' is average center to center spacing of vehicles, then basic capacity of a single lane is
- (A) $1000 S/V$ (B) $100 S/V$
(C) $1000 V/S$ (D) $100 V/S$
33. Maximum permissible gross weight of transport vehicles of Type 2 (Both axles single tyre) is
- (A) 10 Tonne (B) 12 Tonne
(C) 14 Tonne (D) 16 Tonne
34. CBR is a measure of
- (A) Soil Strength
(B) Soil Classification
(C) Relative Stiffness of paving materials
(D) Shear Strength under lateral confinement
35. The method of levelling in which the heights of mountains are found by observing the temperature at which water boils, is known as
- (A) Barometric Levelling (B) Reciprocal Levelling
(C) Longitudinal Levelling (D) Hypsometry

36. Which one of the organization is not related to standards of purified water ?
- (A) World Health Organization (WHO) Committee
 - (B) Indian Council of Medical Research (ICMR) Committee
 - (C) World Water Works Association
 - (D) American Water Works Association Committee
37. For prevention of dental caries in children, the recommended fluoride concentration in water should be in the range of
- (A) 0.2 – 0.7
 - (B) 0.7 – 1.2
 - (C) 1.2 – 1.7
 - (D) 1.7 – 2.2
38. The width of carriageway for Two Lanes, with raised kerbs, as standardized by Indian Roads Congress is
- (A) 3.75 meter
 - (B) 7.0 meter
 - (C) 7.5 meter
 - (D) 5.5 meter
39. If the cross-slope of a country is 10%, the terrain is classified as
- (A) Plain
 - (B) Rolling
 - (C) Mountainous
 - (D) Steep
40. Ring and ball apparatus is used in which test for bitumen ?
- (A) Ductility Test
 - (B) Penetration Test
 - (C) Softening Test
 - (D) Consistency Test.

SECTION – B

Answer *all* questions. Each question carries 6 marks.

6×15=90

41. What are the differences between the economical section and hydraulically efficient channel section.
42. Define the term of 'Recurrence Interval' or 'Return Period'.
43. What do you understand by Seepage Pressure and Quick Sand Condition ?
44. What are the differences between Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).
45. What is "Ruling Gradient" in road construction ?
46. What are the differences between a "Theodolite" and "Tacheometer" ?
47. How does a "Total Station" work ?
48. Why is a barrage important for controlling river water and supplying canal steadily ?
49. Explain the different types of flow in pipes and how they effect fluid measurements.
50. Differentiate between "Composting" and $\frac{\text{Vermi-composting}}{\text{Vermi}}$. Explain their utilities in disposal of society's solid waste.
51. How is reservoir capacity calculated from a contour map. Why is the prismoidal formula preferred for the purpose ?
52. What is the Plate table survey method ? What advantages does it have for mapping land ?
53. Why is super-elevation provided on curves ? What is cant deficiency ?
54. What is the technical differences between a culvert and a bridge based on span or waterway ?
55. Classify the various traffic signs. How do they affect drivers ?

SECTION – C

Answer *all* questions. Each question carries 6 marks.

6×5=30

56. A, B, C, D are four survey stations. At station B, the angle ABC is measured clockwise and found to be $196^{\circ}53'$. On setting up a compass at C, the angle BCD, also measured clockwise, is observed to be $142^{\circ}17'$. If AB is adopted as the meridian, what are the bearing of BC and CD ?
57. A vehicle is travelling at an average speed of 110 km/h under the following conditions :
- (i) level surface
 - (ii) upward gradient of 1.98% and
 - (iii) downward gradient of 2%. Assume perception and brake reaction time = 2.5 seconds and co-efficient of longitudinal friction between vehicle tyres and road surface = 0.35. Determine safe stopping sight distance.
58. Design an irrigation canal to carry or discharge of 3 cumecs, Silt factor $f = 1.0$, Side slope = $\frac{1}{2} : 1$. Also find the longitudinal slope.
59. How much bleaching powder is required to chlorinate 5000 litres of water whose chlorine demand is 2 mg/litre, assuming that the bleaching powder has 25% available chlorine ?
60. For a drainage basin of 600 sq.km, isohyets drawn for a storm gives the following data :

ISOHYETS (Interval in cm)	15-12	12-9	9-6	6-3	3-1
Inter isohyetal area (sq.km)	92	128	120	175	85

Estimate the average depth of precipitation over the catchment.

(Space for rough work)

(Space for rough work)

1900

1900