IMPORTANT NOTES

(A) Please fill up the OMR Sheet of this Question-Answer Booklet properly before answering.

(B) The question paper is divided into different unit and parts. The number of questions to be attempted and their marks are indicated in each unit and parts.

(C) Attempt answers either in Hindi or English, not in both. For Language Papers, answer in concerned language and script, unless directed otherwise to write in Hindi or English specifically.

(D) The candidates should not write the answers beyond the prescribed limit of words; failing this, marks will be deducted.

(E) Please write answers only in the prescribed space of booklet. Do not write any mark of identity inside the Answer Script (including Paper for rough work) i.e., name, address, telephone number, Name of God etc. or any irrelevant words other than the answer of question. Such act will be treated as unfair means. The Commission may also deduct 5 marks from the marks obtained, if Roll Number is not filled correctly on the O.M.R. Sheet.

(F) Candidates are directed that they should not write (answer) out side the border line in every page. Answer written out side the border line will not be checked by the Examiner.

(G) If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English version of the question, the English version will be treated as standard.

(H) It should be ensured that the Question-Answer Booklet is provided in a sealed envelope to the candidate.

(I) Candidate should fill up all desired details on this attached OMR sheet of Question-Answer Booklet with blue ball point pen. Please ensure that this OMR Sheet is not torn or damaged.

(J) This OMR Sheet consists of Two parts, in which some information is pre-printed; remaining details have to be filled by the candidate.

(K) If the Question-Answer Booklet is torn or not printed properly, bring it to notice of invigilator and change the Question-Answer booklet, otherwise the candidate will be liable for that.

Special Notes:
If there is any wrong information filled by the candidate or any attempt is made to damage it or any marking as identification is done, then his candidature for the entire examination shall be rejected by the commission, for which he will be liable.
PART - A

Note: Attempt all twenty questions. Each question carries 2 marks. Answer should not exceed 15 words.

1. Define $\phi$ index.

2. Define sheet erosion.

3. What is effective rainfall?

4. Define unit hydrograph.
5. Define duty of irrigation water.

6. What is Cipoletti weir?

7. What is intensity of irrigation?

9. A drainage canal discharge 0.32 m³/sec and drains 260 hectare. What is drainage coefficient of this land?


10. What is Darcy’s Law?


11. Define relief drain.


12. What is pump efficiency?


15. Define minor irrigation.

16. What is Piezometric surface?

17. Define perched water table.
18. What is hygroscopic water?

19. Calculate the farm conveyance efficiency when a stream of 95 l/s received at the farm gate after being delivered from a canal delivered 72 l/s to the field.

20. What is Reduced Level?
PART – B

Note: Attempt all twelve questions. Each question carries 5 marks. Answer should not exceed 50 words.

21. Classify hydrologic soil groups based on infiltration characteristics.

22. Write the mechanics of sediment transportation in water erosion.
23. Water is flowing in a 10 cm ID pipe at a velocity of 20 m/s. If the pipe is enlarged to 20 cm ID, calculate the velocity and pressure head at this section.

24. Determine the capacity for a sprinkler irrigation system to irrigate 16 hectare of maize crop. Design crop water requirement is 5 mm per day. Moisture replaced in soil at each irrigation is 6 cm. Irrigation efficiency is 70%. Irrigation period is 10 days in a 12-days interval. The system is to be operated for 20 hours per day.
25. Write down the different factors responsible for water logging problems in India.

26. Describe herringbone system of tile drainage with the help of neat sketch.
27. Express the relationship between pump speed and BHP in the performance of centrifugal pump.

28. Write the criteria for selection of irrigation pumps.
29. Define well screen. What are the basic requirements of well screen?

30. A pump is discharging at 4500 litre per minutes of water at 15 m head. If the HP of motor is 20 and motor efficiency is 80%, calculate the pump efficiency.
31. Determine the R.L. of different stations from the following observations:

R.L. of B.M. is 100 m.

<table>
<thead>
<tr>
<th>Station</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
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<td>3.78</td>
<td>2.12</td>
<td>3.88</td>
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<tr>
<td>F.S.</td>
<td>2.16</td>
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</tr>
<tr>
<td>R.L.</td>
<td></td>
<td></td>
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</tbody>
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32. Differentiate between tie line and check in surveying.
PART - C

Note: Attempt all questions. Each question carries 20 marks. Answer should not exceed 200 words.

33. Calculate the discharge from a fully penetrating confined tube well of 15 cm, diameter, the thickness of the aquifer is 20 m, drawdown is 5 m, and radius of influence is 150 m. Assume the permeability of aquifer as 20 mm/min.
34. A single acting reciprocating pump has its piston diameter 15 cm and stroke 25 cm, the piston makes 50 double stocks per minute. The suction and delivery heads are 5 cm and 15 cm respectively.

Find:

(i) the discharge capacity of the pump in litres per minute,

(ii) the force required to work the piston during suction and delivery strokes, if the efficiency of the suction and delivery strokes are 60% and 75%, respectively, and

(iii) the H.P. required by the pump for its operation.
35. Describe the design consideration of furrow irrigation system.
36. What is the importance of irrigation efficiency? Describe the different types of irrigation efficiency.
37. Write the major factors influencing drainage. Also, enlist the benefits of agricultural drainage.