15162

3 Hours / 100 Marks   Seat No.

Instructions :   (1)   All Questions are *compulsory*.

(2)   Answer each next main Question on a new page.

(3)   Figures to the right indicate full marks.

Marks

1.   Answer any FIVE :   **(5 × 4) = 20**

(a)   State any four objectives of drainage.

(b)   (i)   Classify the salt affected soil.

(ii)   State the causes of salt accumulation.

(c)   Define hydraulic conductivity. State factors affecting it.

(d)   State any four types of problems incurring during drainage.

(e)   State any two types of surface drainage systems and one purpose of each.

(f)   State any two types of sub-surface drainage and one advantage of each.

(g)   Enlist any four types of drainage pipes and one purpose of each.

2.   Answer any FOUR :   **(4 × 4) = 16**

(a)   State any four types drainage problems of the country.

(b)   Define leaching. State any two methods of treatment of it.

(c)   Define : (i) drainable porosity (ii) texture of soil – as drainage propensity.

(d)   State purposes of :

(i)   Land levelling

(ii)   Land grading

(e)   Define gravel envelope. State any two design parameters of it.

(f)   Describe vertical drainage system through bore wells.

3. **Answer any FOUR :** **(4 × 4) = 16**

(a) State only one parameter of drainage requirements for any four types of crops.

(b) Write chemical name of gypsum. Explain gypsum requirements.

(c) State the objectives of drainage depth required for various types of crops (any four).

(d) Define drainage coefficient. State purposes to study drainage coefficient.

(e) Draw a labelled diagram of any sub-surface drainage structure.

(f) Explain any two parameters required for estimation of drainage.

4. **Answer any FOUR :** **(4 × 4) = 16**

(a) State any four chemical properties of soil and classify as hazardous and non-hazardous.

(b) Explain the purpose of finding ground-water contours.

(c) Explain meaning of lowering of water tables.

(d) State any four parameters to be considered while designing cross-section of a drain.

(e) Write Hooghoudt's equation and name each parameter associated in the equation.

(f) State functions of sub-surface drainage.

5. **Answer any FOUR :** **(4 × 4) = 16**

(a) (i) State any two benefits of drainage.

(ii) How do drainage help to keep salt balance ?

(b) State two flow characteristics of each, steady and unsteady flow.

(c) Explain economical aspects of surface drain system.

(d) State the factors influencing selection of drain pipes.

(e) State the reasons of dependency for drain depth and spacing w.r.t. hydraulic conductivity.

(f) Differentiate the results between vertical and horizontal sub-surface drainage (any four points).

OR

Draw sketches of various patterns of lay-out of sub-surface drain.

6. **Answer any FOUR :** (4 × 4) = 16

(a) State any two causes and two effects of water logging.

(b) State the function of piezometer in relief drain and mole drain.

(c) Define land smoothing. Explain purposes of it.

(d) State the expression for rectangular drain open channel and explain briefly each component of expression.

(e) What is drain envelope ? Explain its function.

(f) State any four precautionary measures for installing sub-surface drainage system.

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