17674

21415

3 Hours / 100 Marks **Seat No.** | | | | | | | | |

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

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

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-Programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Answer any FIVE : **5 × 4 = 20**

(a) Define Drainage Engineering. Write any four objectives of drainage.

(b) State any four chemical properties of soil.

(c) State any four effects of leaching on soils.

(d) Compare : surface drainage system and sub surface drainage system.

(e) Define land smoothing and levelling.

(f) State the different types of surface drainage systems.

2. Answer any TWO : **2 × 8 = 16**

(a) (i) State any four factors which cause increase in the ground water level.

(ii) State any four advantages of sub-surface drainage over surface drainage.

(b) (i) Write drainage requirements of any two crops.

(ii) Describe a method to prevent water logging.

(c) Describe economic aspect of surface drainage system.

P.T.O.

3. Answer any TWO : **2 × 8 = 16**

(a) (i) Explain classification of salt affected soils.

(ii) Explain importance of salt balances.

(b) State the laboratory procedure for in-situ measurement of hydraulic conductivity by single auger hole method.

(c) Write components and explain layout of sub surface drainage system.

4. Answer any TWO : **2 × 8 = 16**

(a) (i) Define drainage coefficient.

(ii) Describe the laboratory procedure for determination of drainage coefficients.

(b) State Hooghoudt's equation of drain spacing. Explain the assumptions made.

(c) Explain design criteria for steady and unsteady state.

5. Answer any TWO : **2 × 8 = 16**

(a) (i) What are the sources of drainage problems ?

(ii) Explain effects of water logging.

(b) Describe hydraulic design of sub surface drainage system.

(c) Explain the drainage of irrigated lands in arid and semi-arid areas.

6. Answer any TWO : **2 × 8 = 16**

(a) Explain drainage depths for different crops.

(b) Describe installation and working of Piezometer.

(c) (i) Explain the term 'gravel envelop'.

(ii) Describe design aspects of gravel envelop.

———————