

Total No. of Questions : 12]

SEAT No. :

P1053

[Total No. of Pages : 3

[4659]-10

B.E. (Civil Engineering)

b-HYDROINFORMATICS

(2008 Course) (401005) (Semester-I) (Elective-II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer any three questions from each section.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of calculator is allowed.*
- 6) *Assume suitable data if necessary.*

SECTION-I

- Q1) a)** Enumerate the basic scientific disciplines giving important aspects of each on which hydro informatics is based. **[10]**
- b) Design of hydro-informatics system to analyze the quantity and quality of available ground water in a particular area. **[8]**

OR

- Q2) a)** Define Hydroinformatics. What are the different techniques used in Hydroinformatics to solve the water scarcity problem in a particular area? **[8]**
- b) A commercial Hydroinformatics system is to be formed by managing reservoir operation with respect to release of water for an navigation system and for industrial use for a city what components you suggest, explain with justification. **[10]**

- Q3) a)** A multi - criterion decision support systems is to be designed to collect information regarding availability of water resources viz. surface water, ground water, etc. in a district, frame various alternative schemes. **[8]**
- b) You have to design a graphical user interface for streamflow forecasting system, explain the front end and back end parameters. **[8]**

OR

P.T.O.

- Q4)** a) What is a decision support system in water resources engineering? What are its components? What is the role of government sector in decision support system? [8]
- b) Name different software used in Hydroinformatics. Explain any one of them in detail. [8]

- Q5)** a) Compare physics based modeling and data driven modeling. Give examples of each. [8]
- b) Discuss design of simulation model for industrial waste water collection system giving details of objective, scope, basic formulae used, underlying solution procedure, simulation technique used. [8]

OR

- Q6)** a) Discuss any commercial simulation model for two dimensional flow modeling. [8]
- b) Discuss design of simulation model for water release from a dam with respect to objective, scope, basic formulae used, underlying solution procedure, simulation technique used. [8]

SECTION-II

- Q7)** a) How artificial neural networks compare with statistics? What is the terminology used in statistics for the following terms used in ANN? Input, output, training, generalization. [10]
- b) Define normalization in Artificial neural network. What is the importance of normalization? What are typical ranges of normalization? [8]

OR

- Q8)** a) Explain the statement “Artificial Neural Networks are gray boxes”. What is conjugate gradient algorithm? Explain different search routines of conjugate gradient algorithm. [12]
- b) Explain in detail mutation and reproduction in GA. [6]

- Q9)** a) Discuss a study about application of Artificial Neural Networks in Water Resources Engineering giving details about problem definition, objective, data, inputs, outputs, algorithm used and results. [8]
- b) State advantages of Genetic Algorithm over traditional methods. [8]

OR

Q10)a) Explain different techniques of evolutionary computing. Discuss any one of them in detail. [8]

b) Explain the terms epoch, normalization, performance function, activation function, delta rule, over fitting in relation to artificial neural networks? [8]

Q11)a) Discuss limitations Genetic Algorithm of with respect to data requirement, magnitude of data selection process and lack of physical concept. [8]

b) Write the working principle of artificial neural network and enlist various applications of ANN in Water Resources Engineering. [8]

OR

Q12) Write detail notes on (Any Two): [16]

a) Gradient descent algorithm with momentum.

b) Applications of GA in Water Resources Engineering.

c) Recurrent Neural Networks.

