Total No. of Questions : 12]

SEAT No. :

P3300

[Total No. of Pages : 3

# [4959]-10

# B.E. (Civil) (Semester - I)

# HYDROINFORMATICS (Elective - II)

## (2008 Pattern)

*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) Compare numerical modeling and soft computing modeling in Hydroinformatics. **[6]**

b) Enlist the basic scientific disciplines of hydro informatics and explain important aspects of each on which hydro informatics is based. **[6]**

c) What are components of Hydroinformatics systems? Explain in detail different hardware and software components of Hydroinformatics systems. **[6]**

OR

***Q2)*** a) A commercial Hydroinformatics system is to be formed for managing reservior operation with respect to release of water for an irrigation system and for domestic use for a small town what components you suggest, explain with justification. **[6]**

b) Discuss about design of hydro informatics system for information regarding availability of ground water in a particular area. **[6]**

c) Explain the scope of internet and web based modeling in water resources engineering. **[6]**

***P.T.O.***

***Q3)*** a) Name different software used in Hydroinformatics. Explain any one of them in detail. **[8]**

b) 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]**

OR

***Q4)*** a) You have to design a graphical user interface for flood forecasting system, explain the front end and back end parameters. **[8]**

b) 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]**

***Q5)*** a) 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]**

b) Discuss design of simulation model for household sewage 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) Differentiate between physics based modeling and data driven modeling. Give examples of each. **[8]**

## SECTION - II

***Q7)*** a) Write detail note on back propagation and conjugate gradient algorithm. **[6]**

b) 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. **[6]**

c) Explain in detail the step wise procedure for carrying out cross validation. **[6]**

OR

***Q8)*** a) Define epoch, epoch size, error function. **[6]**

b) Define a transfer function. Discuss various types of transfer functions. **[6]**

c) Define normalization in Artificial neural network. What is the importance of normalization? What are typical ranges of normalization? **[6]**

***Q9)*** a) Why Genetic Algorithm is used as an optimizing function? Can it be used to train a neural network? How? **[8]**

b) What are Genetic operators? Explain any two of them in details. **[8]**

OR

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

b) What is real coded Genetic Algorithm? How it differs from standard Genetic Algorithm? **[8]**

***Q11)*** a) What is the importance of 'fitness function' in Genetic Algorithm and explain the operation, reproduction, cross over and mutation of Genetic Algorithm. **[8]**

b) Explain any four applications of Artificial Neural Networks in Water Resources Engineering. **[8]**

OR

***Q12)*** a) Write the working principle of Genetic Algorithm and enlist various applications of Genetic Algorithm in Water Resources Engineering. **[8]**

b) Discuss limitations of ANN with respect to data requirement, magnitude of data, selection of architecture and lack of physical concept. **[8]**