M.E-Second semester-WREM

Register Number: **3608**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2009

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-202. ADVANCED HYDROLOGY

(Common with part time)

Nov.) (Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE questions
All questions carry equal marks

1. Distinguish between
   a) Linear and non-linear models
   b) Lumped and distributed models
   c) Conceptual and black box models

2. Write in detail about API model.

3. Describe a numerical method for hydrologic reservoir routing.

4. Describe the Muskingum method of routing an inflow hydrograph through a channel reach.

5. Discuss, in detail about the components and main properties of hydrological time series.

6. Write a detailed note on Autocorrelation in respect of periodic time series and non periodic independent and dependent time series.

7. Explain the procedure for calculating variance and skewness of 30 years rainfall data for a rainfall station.

8. Explain in detail about any one linear auto regressive model.

Register Number: **8337**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2009

(WATER RESOURCE ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-201. NUMERICAL METHODS

(COMMON WITH PART-TIME)

May] [Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions

(5×12=60)

1. Solve the equations $10x_1+x_2+x_3=12$; $x_1-2x_2+10x_3=9$ and $x_1+10x_2-x_3=10$ by Gauss Jordan method.

2. Solve by relarcation method, the equations, $9x-y+2z+9$; $x+10y-2z=15$; $2x-2y-13z=-17$.

3. Solve the equation $y''-64y+10=0$ with $y(0)=y(1)=0$ as boundary conditions.

4. Given $\frac{dy}{dx}=\frac{1}{x}+y$, $y(0)=2$, $y(0.2)=2.0933$, $y(0.4)=2.1755$, $y(0.6)=2.2493$, find $y(0.8)$ using Milne's method.

5. Solve the boundry value problem $y''+y^2=0$, $y(0)=y(1)=1$ by forward integration, using finite difference of order $h^2\lambda=0.2$.

6. Solve $y^{iv}-16y=x$, $y(0)=y'(0)=0, y(1)=y'(1)=0$ by taking $h=1/4$.

7. Given $f(x,y)=\sqrt{1+x^2+2y^2}$ at the points of the table given below. Evaluate $f(0.25)$ and $f(0.5)$ by quadratic interpolation.

y \ x	−1	0	1
−1	2	1.732051	2
0	1.414214	1.0	1.414214
1	2	1.732051	2

8. Using Crank-Nicholson's method, solve $U_{xx}=16U_t$, $0<x<1$, $t>0$ given $U(x,0)=0$, $U(0,t)=0$ $U(1,t)=50t$, compute U for two steps in to direction taking $h=1/4$.

Register Number: **8338**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2009

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-202. ADVANCED HYDROLOGY

(Common with Part-Time)

May) (Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE full questions
All full questions carry equal marks

1. a) Classify hydrologic models according to the way they treat the randomness of hydro logic phenomena.
   b) Write a note on black box models.

2. Write in detail about simulation models of rainfall-runoff.

3. Distinguish between
   a) Hydraulic and hydrologic method of flood routing
   b) Hydrologic storage and hydrologic chanel routing.

4. Write short notes on:
   a) Muskingum flood routing.
   b) Implicit hydraulic model.

5. Explain in detail about trend and periodicity in time series analysis.

6. Discuss in detail about autocorrelation and partial autocorrelation function.

7. Explain in detail about water resources council method for the determination of coefficient of skewness.

8. Describe box –Jenkin's auto regressive moving average method.

Register Number: **8339**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2009

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-203. FLOOD ESTIMATION AND CONTROL

(Common with Part-Time)

May) (Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE full questions
All full questions carry equal marks

1. Explain in detail the Gumbel's distribution method for prediction of flood peaks.

2. a) Write a brief note on Risk, reliability and safety factor.
   b) A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years.
      i) What is the risk of this hydrologic design?
      ii) If a 5% risk is acceptable, what return period will have to be adopted.

3. A catchment area has a time of concentration of 20 minutes and an area of 20ha.Estimate the peak discharge corresponding to return period of 25 years . Assume a runoff coefficient of 0.25 the intensity-duration –frequency for the storm in the area can be expressed by $i= K T^x/ (D+a)^n$ where I = intensity in an/hr, T = return period in years and D = duration of storm in hours with coefficients K= 6.93 , x=0.189, a= 0.50, n =0.878.

4. Describe in detail the various structural and non-structural methods of flood control.

5. Route the following flood hydrograph through a river reach for which Muskingum coefficient k = 8hr and x = 0.25.

Time(hr)	0	4	8	12	16	20	24	28
Inflow(m	8	16	30	30	25	20	15	10

The initial out flow discharge from the reach is 8 .0m^3/s.

6. Write a detailed note on flood control economics.

7. Explain in detail the methodology involved in flood forecasting system.

8. Given below is the information regarding flood stage, recurrence interval, total damage and cost of the project for giving protection against indicated stage. Work out the benefit- cost ratio and net benefits. What is the pack stage against which you would choose to provide protection?

Flood Stage(m)	Total Damage below indicated (Rs. In million)	Return period(years)	Annal cost of project (in million)
9	0	7	0.8
10	8	10	1.2
11	20	15	1.6
12	40	22	2.0
13	64	30	2.6
14	90	70	3.2
15	120	150	3.6
16	160	300	4.0

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Register Number: **3725**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2010

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-203.REMOTE SENSING AND GIS APPLICATIONS IN WATER RESOURCES ENGINEERING

Nov) (Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE questions
All questions carry equal marks

1. a) Write about the interaction between atmosphere and electromagnetic energy. (6)

   b) Briefly explain the interaction between electromagnetic energy and earth surface material. (6)

2. What is meant by supervised classification and also discuss about various methods of supervised classification used in interpretation of remote sensing images.

3. Write about different types of data inputs and also data editing in GIS.

4. Discuss about basic tool used in vector data analysis in GIS.

5. Explain how would you evaluate the water resources of a watershed region using remote sensing images.

6. Write about implementation of GIS in water resources planning and management.

7. Discuss about various types of map projections and co-ordinate systems used in GIS.

8. Write short notes on any three of the following:
   a) Characteristics of black body radiation.
   b) Edge matching and rubber sheeting.
   c) Buffering and neighborhood function.
   d) Object oriented data base model.
   e) Atmospheric windows.

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Register Number: **8155**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2010

(WATER RESOURCE ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREE206/ENVE-301. WATER QUALITY MODELLING

(Common with Part-Time)

May] [Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions **(5×12=60)**

1. Describe briefly about the water quality models in river basin.

2. Describe the model for ground water quality assessment.

3. Explain the equation for ground water hydraulics.

4. Explain the mathematical model for the discharge of waste water in to a marine environment.

5. Derive and explain the oxygen sag curve and write their limitations and application.

6. Explain the various factors which affect the quality of water in lakes.

7. What are the different types of models used for rivers? Explain.

8. Describe in brief:
   a) Mathematical modeling.
   b) Numerical methods

Register Number:

9231-A

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2011

WATER RESOURCES ENGINEERING AND MANAGEMENT

(SECOND SEMESTER)

WREC-205.SOFT COMPUTING IN WATER RESOURCES MANAGEMENT

(New Regulation)

(Common with Part – Time)

May)

(Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE questions

All questions carry equal marks

1. Define Fuzzy Sets. Explain with suitable example fuzzy sets with a discrete ordered universe.

2. Define membership function with its basic features and its types.

3. With neat block diagram write abut Recurrent Networks.

4. State with neat diagram Neuro-fuzzy computing.

5. Discuss about Simulated annealing.

6. State the application of Neuro fuzzy computing in time series analysis.

7. Write down how fuzzy logic controller is applied in reservoir operation problem.

8. Write short notes on any three of the following:

   a) Activation function

   b)Conventional computing and Neuro –fuzzy computing.

   c) Fuzzy inference systems.

   d) Hebbian learning.

   e) Various learning methods in Neural network.

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Register Number: **9232**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2011

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREE-206. WATER QUALITY MANAGEMENT FOR AGRICULTURE

May] [Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE Questions

1. Differentiate between salinity and alkalinity and explain the buildup of salinity in soil. Also, write about reclamation of both saline and alkaline soils.

2. Discuss in detail about evaluation of infiltration problem and also explain how would you manage the problem using soil-water amendments.

3. Enlist toxic elements and write about the problems each element causes. Also, write briefly about management of the toxicity problems.

4. Write short note on any three of the following:
   a) Water quality requirements for irrigation.
   b) Use of marginal quality water
   c) Corrosion and incrustation
   d) Vector problems

5. State the characteristics of sewage water and its requirements to use in irrigation. Also, discuss about methods of irrigation using sewage water.

6. State the effects of salt concentration on physical properties of soil and crops. Also, write about salt balance and leaching requirements.

7. Discuss about various problems associated with high carbonate water used in overhead sprinkler irrigation.

8. Write about the problems due to abnormal pH and add note on remedial measures.

Register Number: 0606 9227

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC-201.COMPUTATIONAL METHODS IN WATER RESOURCES MANAGEMENT

May) (Time: 3 Hours

Maximum: 60 Marks

Answer any FIVE questions

All questions carry equal marks

1. Briefly explain the concept of mass energy and momentum conservation and also explain the fixed and variances grid method.

2. Make a elaborate note on the modeling principles.

3. Explain the following:
   i)Pipe network in water distribution system.
   ii) Canal automation methods.

4. Briefly explain the unsteady flow pipes and water hammer.

5. Briefly explain the applications of software in water management using hydrological modelling system.

6. Briefly explain the river basin models and groundwater flow model.

7. Briefly explain the principles of physical, mathematical and digital models.

8. Write short notes any THREE of the following:
   Applications of software in water management
   a) QUAL 2E
   b) AGNPS
   c) Water CAD
   d) Aquifer tests
   e) Visual Modflow

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Register Number: **0607**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2015

(WATER RESOURCE ENGINEERING AND MANAGEMENT)

(SECOND SEMESTER)

WREC – 202. WATER RESOURCES SYSTEM ANALYSIS

May] [Time: 3 Hours

Maximum: 75 Marks

Answer any FIVE questions **(5 × 15 = 75)**

1. Discuss in detail the application of systems approach in water resources planning.
2. With a suitable example, explain the problem formulation and determination of optimal solution to a water resource problem.
3. Canal water is to be supplied from an irrigation project to three distinct regions. The available annual water supply is 300 units of water. Table I show the net annual irrigation benefits in monetary units which would accrue to the three regions. Determine the annual water delivery to be made to each of the regions so as to maximize the annual profits. Also determine the maximum annual profit.

Annual water supplied (Units of Water)	Net annual irrigation benefits to regions (monetary units)		
	I	II	III
0	0	0	0
100	300	100	400
200	600	300	500
300	800	900	600

4. Explain in detail how decision making is done under uncertainty.
5. Describe the process involved in optimization of storage reservoirs with an illustrative example.
6. With an Illustrative example, explain how a reservoir simulation can be done. What are the limitations of simulation?
7. Explain the various flood control measures with suitable sketches.
8. Write short notes on any THREE of the following:
   a) Benefit-cost analysis
   b) Forms of LP
   c) DDDP
   d) Unconstrained and constrained nonlinear optimization
   e) Real time operation of reservoirs.

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Register Number: **4207**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2004

(WATER RESOURCES ENGINEERING AND MANAGEMENT)

SECOND SEMESTER

(Common with Part-time)

WREC-201. NUMERICAL METHODS

November] [Time : 3 Hours

Maximum : 60 Marks

Answer any FIVE full questions

All questions carry equal marks

1. Solve the following equations using Gauss – Jordan Method.

$$x + y + z = 9$$
$$2x - 3y + 4z = 13$$
$$3x + 4y + 5z = 40$$

2. Solve the following equations using Jacobi's iteration method.

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

3. Solve the following equations by Relaxation method.

$$9x - 2y + z = 50$$
$$x + 5y - 3z = 18$$
$$-2x + 2y + 7z = 19$$

4. Solve the boundary value problem
$y'' + xy^1 + y = 3x^2 + 2$, $y(0) = 0$ and $y(1) = 1$.

5. Apply Runge Kutta method to find approximate value of y for $x = 0.2$, in steps of 0.1, if $\frac{dy}{dx} = x + y^2$, given that $y = 1$, where $x = 0$.

6. Evaluate the pivotal values of the equation $U_t = 32\ U_{xx}$, taking $\Delta x = 1$ upto $t = 1.25$. The boundary conditions are $u(o, t) = u(5, t) = 0$. $u(x, 0) = x^2 (5 - x)$.

7. Solve $\nabla^2 u = -10 (x^2 + y^2 + 10)$, over the square mesh with sides $x = 0$, $y = 0$, $x = 3$, $y = 3$ with $u = 0$ on the boundary and mesh length 1 unit.

8. Evaluate the double integral $\int_{-2}^{2} \int_{0}^{4} (x^3 - 3y^2 + xy^3)\, dydx$ using any numerical method.

Register Number: **6210**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2007

(WATER RESOURCE ENGINEERING & MANAGEMENT)

SECOND SEMESTER

WREC-204. SYSTEM ANALYSIS IN WATER RESOURCES

May] [Time : 3 Hours

Maximum : 60 Marks

(Common with Part Time)

Answer any FIVE FULL questions

Assume suitable data wherever necessary

1. a) Write a short note on concept of a system.

   b) What are the objective functions involved constructed newly Reservoir or Dam.

2. What are the economic indicator of objectives? Explain the financial feasibility and economic feasibility in water resources system.

3. Maximize the following equations in a Irrigation project:

   Objective function $=x_1+x_2+x_3+2x_4$

   Condition equation: $x_1+x_3+x_4 \leq 4$

   $x_1+x_2+2x_4 \leq 8$

   $x_1+2x_2-x_3-x_4 \leq 6$

4. Using optimum allocation techniques allocate the 10 units of water to 3 users with a return function of.

   $R_1(x_1) = \frac{2}{3} x_1^2$

   $R_2(x_2) = 2\, x_2$

   $R_3(x_3) = 2\sqrt{3x_3}$

5. Describe in detail application of linear programming in reservoir operations.

6. Write a detailed note on different types simulation models.

7. Explain the cost-benefits analysis of irrigation canal project.

8. Describe in detail non-linear programming and goal programming with examples.

Register Number: **6211**

Name of the Candidate:

M.E. DEGREE EXAMINATION, 2007

(WATER RESOURCE ENGINEERING & MANAGEMENT)

SECOND SEMESTER

WREC-205. HYDROMETRY AND REMOTE SENSING

May] [Time : 3 Hours

Maximum : 60 Marks

(Common with Part Time)

Answer any FIVE FULL questions (5×12=60)

1. a) What are the factors influences the Site Selection by Velocity-Area Method?

   b) Write a note on Current Meter errors.

2. Explain the methods of determining the Mean area depth of precipitation over a basin covered by several rain gauge Stations. Indicate the most accurate method of determination give it reasons.

3. a) Explain briefly the evaporation processes. What are the factors that influence the processes of Evaporation?

   b) Suggest a method of estimating evaporation from a storage reservoir.

4. Describe in detail principle and operations involved in water tracer.

5. Explain the stage measuring and recording instruments.

6. a) Explain the values of uncertainties.

   b) Describe the Error equation.

7. Explain the aerial Camera and aerial Photograph with examples.

8. Write a detailed note on Remote Sensing applications in Water Quality.
