

# COLLEGE OF ENGINEERING PUNE

Subject code : CE – 5513

Name of subject: ENVIRONMENTAL IMPACT ASSESSMENT

Programme: F Y M Tech Civil)

Specialization: (Environmental & Water Resource Engineering)

Year: 2011-12

Date: 06 / 05 / 2012

Duration: Three Hours

Max. Marks: 50

### Instructions:

1 Attempt any five questions

2 Assume suitable data if required

3 Use of scientific calculator is allowed

|        |  |    |
|--------|--|----|
| Q.1. A | Explain in brief importance of study of Biological Environment in the study area of a development project.   | 05 |
| B      | Explain the concept of ecosystem. Write in brief classification of ecosystems  | 05 |
| Q.2 A  | Enlist various methods of impact assessment. Explain in details any two methods with example.  | 10 |
| Q.3 A  | Write the detailed information required to be collected for socio-economic impact analysis of a dam project  | 05 |
| B      | What is Environmental Management plan? Explain an EMP for a thermal power plant  | 05 |
| Q.4 A  | What is land use planning? Explain the modifications in the land use pattern due to a construction of a dam and impact on water quality.   | 05 |
| B      | Enlist water resources development projects and Explain in brief Environmental issues in these projects  | 05 |
| Q.5 A  | Write the outline of the contents of an Environmental impact analysis report for a hydro electric power project (Rampur). Write in brief baseline data required to be collected in case of such a project. | 10 |
| Q.6 A  | In an Environmental Assessment Report for a mining project discuss the parameters required to be studied   | 10 |

# Department of Civil Engineering

College of Engineering Pune (CoEP)  
(An Autonomous Institute of Government of Maharashtra)

Programme: MTech (E& WRE)

Max Mark: 50

Subject: Solid and Hazardous Waste Management

Instructions to the candidate:

1. All questions are compulsory
2. Assume suitable data if necessary

- Q.1 a) What is surfactant adsorption? Explain with neat sketch surfactant adsorption isotherm. (4)
- b) Enlist the chemical treatment of hazardous waste. Explain in detail Air Stripping Method (3)
- c) Explain the various factor affecting applicability and effectiveness of DWI (3)

- Q.2 a) The hazardous liquid wastewater with initial concentration 100 mg/L is passed through the column containing adsorbent. The approach velocity is 172 cm/hr. Bed depth is 10 cm. Find adsorption rate constant ( L/ mg.h) and adsorption capacity ( mg/L). The concentration of pollutant at any time is given in the following table.

|         |     |     |    |     |    |    |    |    |    |    |    |
|---------|-----|-----|----|-----|----|----|----|----|----|----|----|
| T ( hr) | 15  | 16  | 17 | 18  | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| C(mg/L) | 1.0 | 3.0 | 60 | 9.0 | 50 | 75 | 88 | 92 | 96 | 98 | 99 |

- (4)
- b) Draw a neat sketch of subsurface waste disposal system of hazardous waste. Write function of each part. (3)
- c) Derive the pseudo second order kinetic model (3)
- Q.3 a) Write in detail on hazardous waste minimization (4)
- b) Estimate the volume (actual) of methane gas from anaerobic digestion of a tonne of waste having the composition  $C_{50}H_{100}O_{40}N$  if 15% portion of waste is used for synthesis of cell tissue. (3)
- c) What is photoremediation? Explain with neat sketch (3)

- Q.4 a) Determine the volume of compacted solid waste. Use following data  
 (i) volume of solid waste =  $15.09 \text{ ft}^3$   
 (ii) total volume of compacted solid waste =  $12.4 \text{ ft}^3$   
 (iii) weight of non compacted solid waste =  $23.2 \text{ lb}$   
 (iv) density of compacted solid waste =  $20 \text{ lb/ft}^3$   
 (v) total weight of solid waste =  $100 \text{ lb}$  (3)
- b) Determine the approximate capacity of truck for the following condition  
 (i) Container size =  $4 \text{ m}^3$ ,  
 (ii) Container utilization factor =  $0.75$ , number of containers =  $2$ ,  
 (iii) Compaction ratio =  $2.5$ ,  
 (iv) Container unloading time =  $0.1 \text{ hr/container}$  average time between container location =  $0.1 \text{ h}$ ,  
 (v) One way haul distance =  $35 \text{ km}$ , speed limit  $88 \text{ km/hr}$ ,  $t_1 = 0.45 \text{ hr}$ ,  
 (vi)  $t_2 = 0.33 \text{ hr}$ ,  $N_d = 2$ ,  $H = 8 \text{ hr}$ , off root function =  $0.15$  (5)
- c) Derive the second order kinetic model (2)
- Q.5 a) Explain the important characteristics of hazardous waste (4)
- b) What is break even analysis? Explain with neat sketch (3)
- c) Explain with neat sketch operation of sanitary landfill (3)

# COLLEGE OF ENGINEERING PUNE

Test: End Semester Examination

Subject code: CE - 5522

Name of subject: STOCHASTIC HYDROLOGY

Programme: M. Tech. (E&WRE)

Year: 2011-12

Duration: 3 hrs

Date: 08/05/2012

Max. Marks: 50

## Instructions:

1. All questions are compulsory.
2. Draw neat figures wherever required
3. Assume suitable data if necessary
4. Use of scientific calculator is allowed
5. Figures to the right indicate full marks

6. **Answer Question number 7 and any five questions from the remaining numbers of questions.** 7) TABLE A-I is enclosed

Q.1. An experiment consists of observing the annual peak discharge of two streams just upstream of their confluence. It is believed that the annual peak discharge of one stream 'x' can almost be 1600 cumec. While the annual peak discharge of the other stream 'y' can't exceed 2800 cumec. Construct a suitable sample space for this experiment and on this sample space indicate the event that the project would not fail. A project proposed just downstream of the confluence is designed for a peak flow of 2800 cumec. 08

Q.2. a) What do you mean by Conditional Probability. Write in detail along with all the Mathematical expressions. 04

b) Discuss in detail about the Probability Function and Distribution Function of a Discrete Random Variable. 04

Q.3. a) The duration of a monsoon storm 'X' is a random variable whose probability density function is given by

$$f(x) = kx^2 \quad \text{for}$$

$$f(x) = k(17-x)^2 \quad \text{for}$$

$f(x) = 0$  elsewhere. Evaluate the constant 'k'. What is the probability that the duration of the storm is between 6 hour to 10 hour, given that the storm lasted for 6 hours. 04

b) Given that the joint probability density function

$f(x, y) = 0.666(x + 2y)$  for  $0 < x < 1$  and  $0 < y < 1$  and  $f(x, y) = 0$  elsewhere. Find the marginal function of X and Y. 04

Q.4. a) Write in brief about Skewness Coefficient and Kurtosis Coefficient. 04

b) Write in brief about the Central Limit Theorem 04

Q.5. )The annual runoff of a stream is modelled by a normal distribution with mean and standard deviation of 5000 ha-m and 1000 ha-m respectively

i) Find the probability that the annual runoff in any year is more than 6500 ha-m. 08

ii) Also find the probability that it would be between 3800 ha-m and 5800 ha-m.

Q.6) Write in brief about Negative Binomial Distribution and Poisson Distribution along with all the important mathematical symbols and equations. 08

Q.7. What do you mean by Correlation and Regression? Write in detail about them along with necessary sketches.

Q.7. The Concurrent average yearly rainfall all over as basin and the corresponding yearly runoff, both expressed in cm for a period of 17 years. They are given in a tabular form. Establish the dependence between yearly rainfall and yearly runoff by computing the coefficient of correlation between them. 10

| Year | Rainfall | Runoff |
|------|----------|--------|
| 01   | 113      | 74     |
| 02   | 128      | 104    |
| 03   | 127      | 96     |
| 04   | 104      | 61     |
| 05   | 108      | 59     |
| 06   | 115      | 82     |
| 07   | 167      | 109    |
| 08   | 154      | 102    |
| 09   | 99       | 57     |
| 10   | 119      | 78     |
| 11   | 152      | 109    |
| 12   | 137      | 96     |
| 13   | 165      | 124    |
| 14   | 151      | 103    |
| 15   | 160      | 134    |
| 16   | 130      | 87     |
| 17   | 149      | 106    |

Q.8.a) Write in detail about Classification of Time series. 04

b) Write about 1<sup>st</sup> order AR process and also give idea about 2<sup>nd</sup> order AR process. 04

Q.9.a) Discuss about line Spectrum along with all the required Mathematical Equations. 08

Q.10. Discuss at length about Multivariate Stochastic Models. 08

TABLE A-1  
Table of the Standard Cumulative Normal Distribution

$$F(z) = (2\pi)^{-1/2} \int_{-\infty}^z e^{-u^2/2} \cdot du$$

| z   | .00    | .01    | .02    | .03    | .04    | .05    | .06    | .07    | .08    | .09    |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| .0  | .5000  | .5040  | .5080  | .5120  | .5160  | .5199  | .5239  | .5279  | .5319  | .5359  |
| .1  | .5398  | .5438  | .5478  | .5517  | .5557  | .5596  | .5636  | .5675  | .5714  | .5753  |
| .2  | .5793  | .5832  | .5871  | .5910  | .5948  | .5987  | .6026  | .6064  | .6103  | .6141  |
| .3  | .6179  | .6217  | .6255  | .6293  | .6331  | .6368  | .6406  | .6443  | .6480  | .6517  |
| .4  | .6554  | .6591  | .6628  | .6664  | .6700  | .6736  | .6772  | .6808  | .6844  | .6879  |
| .5  | .6915  | .6950  | .6985  | .7019  | .7054  | .7088  | .7123  | .7157  | .7190  | .7224  |
| .6  | .7257  | .7291  | .7324  | .7357  | .7389  | .7422  | .7454  | .7486  | .7517  | .7549  |
| .7  | .7580  | .7611  | .7642  | .7673  | .7703  | .7734  | .7764  | .7794  | .7823  | .7852  |
| .8  | .7881  | .7910  | .7939  | .7967  | .7995  | .8023  | .8051  | .8078  | .8106  | .8133  |
| .9  | .8159  | .8186  | .8212  | .8238  | .8264  | .8289  | .8315  | .8340  | .8365  | .8389  |
| 1.0 | .8413  | .8438  | .8461  | .8485  | .8508  | .8531  | .8554  | .8577  | .8599  | .8621  |
| 1.1 | .8643  | .8665  | .8686  | .8708  | .8729  | .8749  | .8770  | .8790  | .8810  | .8830  |
| 1.2 | .8849  | .8869  | .8888  | .8907  | .8925  | .8944  | .8962  | .8980  | .8997  | .90147 |
| 1.3 | .90320 | .90490 | .90658 | .90824 | .90988 | .91149 | .91309 | .91466 | .91621 | .91774 |
| 1.4 | .91924 | .92073 | .92220 | .92364 | .92507 | .92647 | .92785 | .92922 | .93056 | .93189 |

| z   | .00     | .01     | .02     | .03     | .04     | .05     | .06     | .07     | .08     | .09     |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1.5 | .93319  | .93448  | .93574  | .93699  | .93822  | .93943  | .94062  | .94179  | .94295  | .94408  |
| 1.6 | .94520  | .94630  | .94738  | .94845  | .94950  | .95053  | .95154  | .95254  | .95352  | .95449  |
| 1.7 | .95543  | .95637  | .95728  | .95818  | .95907  | .95994  | .96080  | .96164  | .96246  | .96327  |
| 1.8 | .96407  | .96485  | .96562  | .96638  | .96712  | .96784  | .96856  | .96926  | .96995  | .97062  |
| 1.9 | .97128  | .97193  | .97257  | .97320  | .97381  | .97441  | .97500  | .97558  | .97615  | .97670  |
| 2.0 | .97725  | .97778  | .97831  | .97882  | .97932  | .97982  | .98030  | .98077  | .98124  | .98169  |
| 2.1 | .98214  | .98257  | .98300  | .98341  | .98382  | .98422  | .98461  | .98500  | .98537  | .98574  |
| 2.2 | .98610  | .98645  | .98679  | .98713  | .98745  | .98778  | .98809  | .98840  | .98870  | .98899  |
| 2.3 | .98928  | .98956  | .98983  | .920097 | .920358 | .920613 | .920863 | .921106 | .921344 | .921576 |
| 2.4 | .921802 | .922024 | .922240 | .922451 | .922656 | .922857 | .923053 | .923244 | .923431 | .923613 |
| 2.5 | .923790 | .923963 | .924132 | .924297 | .924457 | .924614 | .924766 | .924915 | .925060 | .925201 |
| 2.6 | .925339 | .925473 | .925604 | .925731 | .925855 | .925975 | .926093 | .926207 | .926319 | .926427 |
| 2.7 | .926533 | .926636 | .926736 | .926833 | .926928 | .927020 | .927110 | .927197 | .927282 | .927365 |
| 2.8 | .927445 | .927523 | .927599 | .927673 | .927744 | .927814 | .927882 | .927948 | .928012 | .928074 |
| 2.9 | .928134 | .928193 | .928250 | .928305 | .928359 | .928411 | .928462 | .928511 | .928559 | .928605 |
| 3.0 | .928650 | .928694 | .928736 | .928777 | .928817 | .928856 | .928893 | .928930 | .928965 | .928999 |
| 3.1 | .930324 | .930646 | .930957 | .931260 | .931553 | .931836 | .932112 | .932378 | .932636 | .932886 |
| 3.2 | .933129 | .933363 | .933590 | .933810 | .934024 | .934230 | .934429 | .934623 | .934810 | .934991 |
| 3.3 | .935166 | .935335 | .935499 | .935658 | .935811 | .935959 | .936103 | .936242 | .936376 | .936505 |
| 3.4 | .936631 | .936752 | .936869 | .936982 | .937091 | .937197 | .937299 | .937398 | .937493 | .937585 |
| 3.5 | .937674 | .937759 | .937842 | .937922 | .937999 | .938074 | .938146 | .938215 | .938282 | .938347 |
| 3.6 | .938409 | .938469 | .938527 | .938583 | .938637 | .938689 | .938739 | .938787 | .938834 | .938879 |
| 3.7 | .938922 | .938964 | .940039 | .940426 | .940799 | .941158 | .941504 | .941838 | .942159 | .942468 |
| 3.8 | .942765 | .943052 | .943327 | .943593 | .943848 | .944094 | .944331 | .944558 | .944777 | .944988 |
| 3.9 | .945190 | .945385 | .945573 | .945753 | .945926 | .946092 | .946253 | .946406 | .946554 | .946696 |

COLLEGE OF ENGINEERING PUNE

Subject code : CE-5524

Name of subject: REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS

Programme: F Y M Tech Civil

Specialization: (Environmental & Water Resource Engineering)

Year: 2011-12  
Duration: 3Hrs

Date: 14 / 05/ 2012  
Max. Marks: 50

Instructions:  
1 Attempt all questions

|         |   |    |
|---------|---|----|
| Q.1. A  | 1. What is GIS?   | 2  |
|         | 2. What is overlay analysis and explain at least 2 overlay techniques?    | 4  |
|         | 3. What is active and Passive Remote sensing                              | 4  |
| Q. 2 A  | What are different digitization techniques                                | 5  |
| B       | What is interpolation and name the different interpolation techniques     | 5  |
| Q. 3 A  | Explain visual Image interpretation keys                                  | 10 |
| Q. 4 A  | Explain GIS data types their advantage and disadvantage                   | 10 |
| Q. No.5 | What is DEM, How it generated and what are the different byproduct of DEM |    |
|         |   |    |