

I B.Tech I Semester Supplementary Examinations, Oct/nov 2013
ENVIRONMENTAL STUDIES
**(Common to Mechanical Engineering, Electronics & Communication
 Engineering, Chemical Engineering, Information Technology, Electronics &
 Computer Engineering, Mining and Petroleum Technology)**

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) "Environmental studies subject is multidisciplinary in nature"? Explain.
 (b) Describe what is the need to study the subject Environmental studies at all levels? [8+7]
2. (a) Define a mineral, explain how do you develop a mining area and give what are the methods to be followed to extract the mineral resources in detail?
 (b) Discuss different problems over mining personals and on environment during extraction of minerals? [8+7]
3. Explain why the following are important:
 (a) Coral reefs
 (b) Mangroves
 (c) Coastal wetlands and estuaries [5+5+5]
4. (a) Explain about direct values of biodiversity.
 (b) What are the major causes of man-wildlife conflicts? Discuss the remedial steps that can curb the conflicts. [7+8]
5. (a) Write a note on cyclone scrubbers
 (b) Mention the advantages and disadvantages of cyclone scrubbers [8+7]
6. (a) Define sustainability? What are major concepts for sustainable development?
 (b) Explain how consumerism has affected the present society? [8+7]
7. (a) What do you mean by "Slum"? What kind of shelter does it provide?
 (b) What are the objectives of UDHR by the United Nations? [8+7]
8. (a) Explain what are the types of zooplankton, phytoplankton present in the Aquatic regions.
 (b) Explain the functions of CPCB & SPCB in controlling the pollution levels in the industrial sector. [8+7]

I B.Tech I Semester Supplementary Examinations, Oct/nov 2013
ENVIRONMENTAL STUDIES
**(Common to Mechanical Engineering, Electronics & Communication
 Engineering, Chemical Engineering, Information Technology, Electronics &
 Computer Engineering, Mining and Petroleum Technology)**
Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain how you would become act like a watch dog in preserving the natural assets?
 (b) Explain the importance of a PIL and describe whom it can be filed in the courts with a case study? [8+7]
2. (a) Explain what is the major concern regarding use of atomic power with a case study?
 (b) Write short note on hydro power and bio-energy. [15]
3. (a) Describe the desert and semi-arid ecosystems and where are they found in India
 (b) Why is a complex ecosystem more stable than one with few species? [8+7]
4. (a) Classify the types of biodiversity and explain in detail with examples.
 (b) Discuss the causes of man-wild life conflicts. Suggest suitable wild life Conservation practices. [8+7]
5. (a) Discuss the effects of disasters on environment?
 (b) Briefly explain the steps taken in India to fight these disasters? [8+7]
6. (a) Write short notes on sources, effects and control measures of
 (i) Acid rains (ii) Ozone layer depletion?
 (b) Give a detailed account of methods used in water conservation? [8+7]
7. Write short notes on the following with examples
 - (a) Birth rate
 - (b) Death rate
 - (c) Poverty
 - (d) Migration [4+4+4+3]
8. (a) Explain different pollution control equipment you observe in the industry you visit with neat flow diagram.
 (b) Does all the polluting industries maintain the proper pollution disposal measures, if not can you suggest some measures for implementing the environmental Laws in the industrial sector. [8+7]

Code No: R10106/R10

Set No. 2

I B.Tech I Semester Supplementary Examinations, Oct/nov 2013
ENVIRONMENTAL STUDIES
**(Common to Mechanical Engineering, Electronics & Communication
 Engineering, Chemical Engineering, Information Technology, Electronics &
 Computer Engineering, Mining and Petroleum Technology)**
Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. Explain different types of environments and describe the three important constituents of physical environment? How will you differentiate between microclimate, climate and weather. [15]
2. Discuss the reasons for land degradation and suggest steps to control it and explain what is Soil management, Shifting cultivation, Desertification and Man induced landslides. [15]
3. (a) Differentiate between terrestrial ecosystem and aquatic ecosystem with reference to their structure and functions
 (b) Discuss the ecological adaptation by natural selection. [8+7]
4. (a) What are the various strategies of ex-situ conservation of biodiversity?
 (b) Describe the ecological significance of biodiversity. [8+7]
5. (a) Discuss the effects of disasters on environment?
 (b) Briefly explain the steps taken in India to fight these disasters? [8+7]
6. (a) Discuss the salient features of Wild life (protection) Act, 1972
 (b) Discuss the salient features of Forest (conservation) Act, 1980 [8+7]
7. Write notes on the following social security measures
 - (a) Life insurance
 - (b) PPF
 - (c) Categorical benefits
 - (d) Employee's provident fund [4+4+4+3]
8. (a) Give some suggestions to reduce the generation of solid waste in the urban areas.
 (b) What are the types of forests grow in the hill regions. [8+7]

I B.Tech I Semester Supplementary Examinations, Oct/nov 2013
ENVIRONMENTAL STUDIES
**(Common to Mechanical Engineering, Electronics & Communication
 Engineering, Chemical Engineering, Information Technology, Electronics &
 Computer Engineering, Mining and Petroleum Technology)**
Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain how you would act like a watch dog in preserving the natural assets?
 (b) Explain the importance of a PIL and describe whom it can be filed in the courts with a case study? [8+7]
2. Discuss the reasons for land degradation and suggest steps to control it and explain what is Soil management, Shifting cultivation, Desertification and Man induced landslides. [15]
3. (a) Define ecosystem and list components of an ecosystem.
 (b) How do human activities lead to degradation of ecosystem? [8+7]
4. (a) Identify and explain the present day major threats to the biodiversity of India
 (b) Explain about productive value of biodiversity. [8+7]
5. (a) Discuss the role played by the Government in controlling water pollution
 (b) Write short notes on the following
 - i. Skimming tanks
 - ii. Trickling filter
[8+7]
6. (a) What do you mean by 'environment refugees' (or)'oustees'?
 (b) What are the major causes for displacement of Native tribal people. [8+7]
7. (a) Write the sterilization methods
 (b) what are the major rules and Laws in India to safeguard the interest of women? [8+7]
8. (a) Explain how Industrialisation and Urbanization leads to the pollution do.
 (b) Explain your general observations when you visit near by solid waste management site. [8+7]

I B.Tech I Semester Supplementary Examinations, Oct/Nov 2013
MATHEMATICAL METHODS

(Common to Civil Engineering, Electrical & Electronics Engineering,
 Computer Science & Engineering, Electronics & Instrumentation
 Engineering, Aeronautical Engineering, Bio-Technology and Automobile
 Engineering)

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find rank of matrix using Echelon form $A = \begin{bmatrix} 1 & 2 & -4 & 5 \\ 2 & -1 & 3 & 6 \\ 8 & 1 & 9 & 7 \end{bmatrix}$
 (b) Solve the equations using Gauss Jordan method
 $x+5y+z=9, \quad 2x+y+3z=12, \quad 3x+y+4z=16$ [7+8]
2. Using Cayley – Hamilton theorem find A^8 if $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ [15]
3. Reduce the quadratic form $6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 + 4x_1x_3 - 2x_2x_3$ to the sum of squares form by diagonalization and find the corresponding linear transformation. Also find the index and signature. [15]
4. (a) Find a real root of the equation $x \sin x + \cos x = 0$, using Newton-Raphson's method
 (b) Evaluate $\sqrt{12}$ and $\frac{1}{\sqrt{12}}$ using fixed point iteration method. [8+7]
5. (a) If the interval of differencing is unity, prove the following: $\Delta \left\{ \frac{1}{f(x)} \right\} = - \frac{\Delta f(x)}{f(x)f(x+1)}$
 (b) Given that $\sin 45^\circ = 0.7071$, $\sin 50^\circ = 0.8192$, $\sin 60^\circ = 0.8660$, find $\sin 48^\circ$. [8+7]
6. (a) Compute $f'(1)$ using the given data:

X	1.0	1.5	2.0	2.5	3.0
f(x)	27	106.75	324	783.75	1621

 (b) Using Simpson's 3/8th rule evaluate $\int_0^6 \frac{dx}{1+x^2}$ by dividing the range into 6 equal parts [8+7]
7. (a) Solve $y' = -xy^2$, $y(0) = 2$ by modified Euler's method and hence find $y(0.1)$, $y(0.2)$
 (b) Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$ by fourth order R-K method and hence find $y(0.2)$, $y(0.4)$ [8+7]
8. (a) Fit a least square parabola $y = a + bx + cx^2$ to the data $(-1, 2), (0, 1), (1, 4)$

(b) By the method of least squares fit a straight line to the following data

x	5	10	15	15	20
y	15	19	23	26	30

[8+7]

I B.Tech I Semester Supplementary Examinations, Oct/Nov 2013
MATHEMATICAL METHODS

(Common to Civil Engineering, Electrical & Electronics Engineering,
 Computer Science & Engineering, Electronics & Instrumentation
 Engineering, Aeronautical Engineering, Bio-Technology and Automobile
 Engineering)

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find rank of matrix using Echelon form $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$
 (b) Solve the equations using Gauss Jordan method
 $x_1 + x_2 + x_3 = 8$, $2x_1 + 3x_2 + 2x_3 = 19$, $4x_1 + 2x_2 + 3x_3 = 23$ [7+8]
2. Verify Cayley – Hamilton theorem and find A^{-1} if $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ [15]
3. (a) Find the nature of the quadratic form $5x^2 + 5y^2 + 14z^2 + 2xy - 16yz - 8zx$
 (b) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}$ then find A^{50} [8+7]
4. (a) Apply Newton-Raphson's formula to find the cube root of 5 correct up to three decimal places starting from $x_0=1$.
 (b) Find a real root of $f(x)=x^2 - 3x + 1 = 0$ correct up to three decimal places starting with $x=1$ by Iterative method. [8+7]
5. The following table gives the population of a town during the last six censuses. Estimate, using Newton's interpolation formula, the increase in the population during the period 1986 to 1988.

year	1911	1921	1931	1941	1951	1961
Population (in thousands)	12	15	20	27	39	52

[15]
6. (a) Given the following data of X and Y

X	1.0	1.2	1.4	1.6	1.8	2.0
Y	2.72	3.32	4.06	4.96	6.05	7.39

 Find the first and second derivatives at $x = 1.0$
 (b) The table below shows the temperature $f(t)$ as a function of time

t	1	2	3	4	5	6	7
f(t)	81	75	80	83	78	70	60

 Use Simpson's 1/3 method to estimate $\int_1^7 f(t) dt$. [8+7]

7. (a) Solve $y^1 = 3x^2 + 1$ by Euler's method and find y at $x=2$ by taking $h=0.5$
 (b) Solve by fourth order R-K method $y^1 = x-y$, $y(1)=0.4$ and hence find $y(1.2)$
 [8+7]

8. (a) Fit a curve of the type $y = a+bx+cx^2$ to the following data

x	10	15	20	25	30	35
y	35.3	32.4	29.2	26.1	23.2	20.5

- (b) Fit a curve of the type $y=ab^x$ to the following data by the method of least squares

x	1	2	5	10	20	30	40	50
Y	98.2	91.7	81.3	64	36.4	32.6	7.1	11.3

[7+8]

I B.Tech I Semester Supplementary Examinations, Oct/Nov 2013
MATHEMATICAL METHODS

(Common to Civil Engineering, Electrical & Electronics Engineering,
 Computer Science & Engineering, Electronics & Instrumentation
 Engineering, Aeronautical Engineering, Bio-Technology and Automobile
 Engineering)

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define rank and find the rank of matrix $A = \begin{bmatrix} 1 & 3 & 6 & -1 \\ 1 & 4 & 5 & 1 \\ 1 & 5 & 4 & 3 \end{bmatrix}$ using Echelon form
 (b) Find values of x,y and z using Gauss Jordon method $2x+y-z=1$; $x-y+z=2$;
 $5x+5y-4z=3$ [7+8]

2. Find Eigen Vectors of $A = \begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}$ [15]

3. (a) By Lagrange's reduction reduce the quadratic form X^TAX to sum of squares
 form for $A = \begin{bmatrix} 1 & 2 & 4 \\ 2 & 6 & -2 \\ 4 & -2 & 18 \end{bmatrix}$.
 (b) Find the values of a, b, c if $\begin{bmatrix} 0 & 2b & c \\ a & b & -c \\ a & -b & c \end{bmatrix}$ is an orthogonal matrix [8+7]

4. (a) Find a real root of the equation using Newton-Raphson's method $\cos^2 x - x = 0$
 (b) Find a root of the equation $x^3 e^x - x - 1 = 0$ by Bisection method. [8+7]

5. (a) (i) Solve $\Delta(e^{ax} \log bx)$ (ii) Prove that $\nabla^6 y_8 = \Delta^6 y_2$.
 (b) From the following table for find f(3.3) using gauss forward interpolation formula.

x	1	2	3	4	5
$y = f(x)$	15.30	15.10	15.00	14.50	14.00

[8+7]

6. (a) A curve is expressed by the following values of x and y. Find the slope at the point $x = 0.5$.

X	0.4	0.5	0.6	0.7	0.8
y	1.58	1.80	2.04	2.33	2.65

Calculate the angular velocity and the angular acceleration of the rod when $t = 0.3$ seconds.

- (b) Evaluate $\int_0^1 \frac{1}{1+x} dx$, by Trapezoidal rule and Simpson's $\frac{1}{3}$ rule. [8+7]
7. Solve $y^1 = x - y$, $y(0) = 1$, $h = 0.1$ by Milne's predictor corrector method to find $y(0.4)$. Use Euler's modified method to evaluate $y(0.1)$, $y(0.2)$, $y(0.3)$ [15]
8. (a) Fit a power curve $y = ax^b$ to the following data
- | | | | | | |
|---|-----|------|------|-----|-----|
| X | 1 | 2 | 3 | 4 | 5 |
| Y | 7.1 | 27.8 | 62.1 | 110 | 161 |
- (b) Fit a least square parabola $y = a + bx + cx^2$ to the following data
- | | | | | | |
|---|---|---|----|----|----|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 1 | 5 | 10 | 22 | 38 |
- [7+8]

I B.Tech I Semester Supplementary Examinations, Oct/Nov 2013
MATHEMATICAL METHODS

(Common to Civil Engineering, Electrical & Electronics Engineering,
 Computer Science & Engineering, Electronics & Instrumentation
 Engineering, Aeronautical Engineering, Bio-Technology and Automobile
 Engineering)

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find rank of matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -2 & 0 \\ 3 & 1 & 4 \\ -2 & 3 & 1 \end{bmatrix}$ using Normal form.
 (b) Solve system of equations, if consistent $x+y+2z=4$, $2x-y+3z=9$, $3x-y-z=2$ [7+8]
2. Show that matrix $A = \begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$ satisfies Cayley – Hamilton theorem [15]
3. Find the rank, signature and index of the quadratic form $2x_1^2 + x_2^2 - 3x_3^2 + 12x_1x_2 - 4x_1x_3 - 8x_2x_3$ by reducing it to normal form .Also write the linear transformation which brings about the normal reduction [15]
4. (a) Find a real root of the equation $x \sin x + \cos x = 0$, using Newton-Raphson's method
 (b) Evaluate $\sqrt{12}$ and $\frac{1}{\sqrt{12}}$ using fixed point iteration method. [8+7]
5. (a) Evaluate the following, interval of differencing being unity. $\Delta \tan^{-1} ax$ (ii)
 $\Delta (e^{2x} \log 3x)$
 (b) Find $y(25)$, given that $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$, Using Gauss forward difference Interpolation formula. [8+7]
6. (a) For the function $y = f(x)$ given by the following Table, find y' at $x = 0.04$ using the Bessel's formula.

x	0.01	0.02	0.03	0.04	0.05	0.06
y	0.1023	0.1047	0.1071	0.1096	0.1122	0.1148

 (b) Evaluate $\int_0^4 e^{1/x} dx$ by using the Simpson's 3/8th rule, by dividing the interval into 3 equal parts. [8+7]
7. (a) Solve $y^1 = 3x^2 + 1$ by Euler's method and find y at $x=2$ by taking $h=0.5$
 (b) Solve by fourth order R-K method $y^1 = x - y$, $y(1) = 0.4$ and hence find $y(1.2)$ [8+7]

8. (a) Fit a least square parabola $y = a + bx + cx^2$ to the following data

x	1	2	3	4	5
y	2	3	5	8	10

- (b) Fit a straight line of the form $y = a + bx$ to the following data

x	-1	0	1	2	3	4	5	6
y	10	9	7	5	4	3	0	-1

[8+7]
