

AR16

CODE: 16HS1003

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech II Semester Supplementary Examinations, October, 2022

**ENVIRONMENTAL STUDIES
(Common to CE, ME, CSE & IT)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. Define environment with neat sketch. What is the scope of environmental studies? 14M
(OR)
2. What are the major causes of deforestation? Briefly explain the effects of deforestation on environment. 14M

UNIT-II

3. a Define ecosystem 4M
b What are the biotic and abiotic components of an ecosystem? 10M
(OR)
4. a What are the different types of Biodiversity? 9M
b Discuss about hotspots of biodiversity. 5M

UNIT-III

5. What are the main sources of water pollution? Discuss its effects and control measures. 14M
(OR)
6. Mention various methods used to dispose solid wastes along with their merits and demerits with case study. 14M

UNIT-IV

7. Discuss different measures to conserve water? 14M
(OR)
8. How do you define pollution as per water (prevention and control of pollution) Act 1974? What are the salient features of the Act? 14M

UNIT-V

9. a Discuss about Population growth 7M
b Explain i) Doubling time ii) Total fertility rate iii) life expectancy 7M
(OR)
10. Explain the step by step procedure to record and document the environmental features and resource assets of an ecosystem during a field visit 14M

AR16

CODE: 16EC1001

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech II Semester Supplementary Examinations, October, 2022

ELECTRONIC DEVICES

(Electronic and Communication Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the motion of a charged particle between two parallel electric plates. 8M
- b) Explain how voltage, current and phase are measured using cathode ray oscilloscope. 6M

(OR)

2. a) Explain the operation of CRO with a neat block diagram and mention its applications. 14M

UNIT-II

3. a) Explain the concepts of Einstein relationship and continuity equation. 8M
- b) Explain the classification of materials based on energy band diagram. 6M

(OR)

4. a) What is the difference between intrinsic and extrinsic semiconductors? Explain the formation of P-type semiconductor with a neat sketch. 8M
- b) Explain the expression for conductivity of a semiconductor and find the intrinsic conductivity for silicon. Assume $n_i = 1.5 \times 10^{10} \text{ cm}^{-3}$, $\mu_n = 1300$ and $\mu_p = 500 \text{ cm}^2/\text{V-s}$ respectively. 6M

UNIT-III

5. a) Discuss the V-I characteristics of PN junction diode and its dependency on the temperature. 8M
- b) Write a short notes on varactor diode and LED. 6M

(OR)

6. a) Explain the concept of Zener break down and application of Zener diode as voltage regulator. 8M
- b) Derive the expression for transition capacitance of a PN junction diode. 6M

UNIT-IV

7. a) With a neat sketch, explain different current components in bipolar junction transistor and give their relationship. 8M
- b) Explain how transistor acts as an amplifier. 6M

(OR)

8. a) Explain the input and output characteristics of bipolar junction transistor in CE configuration. 10M
- b) Calculate the emitter current in a BJT with current gain $\alpha = 0.98$ and base current 0.2mA. 4M

UNIT-V

9. a) Discuss the V-I characteristics of UJT with a neat diagram. 8M
- b) Explain MOSFET characteristics in any one mode. 6M

(OR)

10. a) With a neat sketch, explain n channel JFET characteristics. 8M
- b) Compare bipolar junction transistor and junction field effect transistor. 6M

AR13

CODE: 13BS1002

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, October, 2022

ENGINEERING MATHEMATICS -II

(Common to EEE & ECE)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is meant by iteration process?
b) Write the normal equations for a second degree curve.
c) Lagrange's interpolation formula
d) Simpson's 3/8 rule
e) Write Taylor's series formula.
f) Find Laplace transform of $\sin at$?
g) Find $L^{-1}\left[\frac{s-a}{(s-a)^2+b^2}\right]$?
h) Define non-linear partial differential equations of the first order.
i) Solve $p - q = 1$.
j) Write one dimensional heat equation.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) By using the regula fasli method, find an approximate root of the equation $x \log_{10} x = 1.2$ correct to four decimal places. 6M
b) Find by the Newton's method, the real root of the equation $xe^x - 2 = 0$. 6M

(OR)

3. a) Fit a second degree parabola to the following data: 6M

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

- b) Derive the normal equations for the curve of the type $y = ab^x$ by the method of least squares 6M

UNIT-II

4. a) Find the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for 6M

x	0	1	2	5
y	2	3	12	147

- b) Evaluate (i) $\Delta \tan^{-1} x$ (ii) $\Delta^2 (\cos 2x)$ 6M

(OR)

5. a) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using the entire data: 6M

Time t (sec)	0	5	10	15	20
Velocity v (m/sec)	0	3	14	69	228

- b) Use the Trapezoidal rule to estimate the integral $\int_0^6 \frac{1}{1+x^2} dx$ 6M

UNIT-III

6. a Find the value of y for $x = 0.1$ by Picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$. 6M
- b Using Euler's modified method, obtain a solution of the equation $\frac{dy}{dx} = x + \sqrt{y}$ with initial conditions $y=1$ at $x=0$, for the range $0 \leq x \leq 0.6$ in steps of 0.2. 6M

(OR)

7. a) Using Runge-Kutta method of fourth order, solve for y at $x=1.2, 1.4$ from $\frac{dy}{dx} = \frac{2xy + e^x}{x^2 + xe^x}$ given $x_0 = 1, y_0 = 0$. 6M
- b) Given $y' = x(x^2 + y^2)e^{-x}$, $y(0) = 1$, find y at $x = 0.1, 0.2$ and 0.3 by Taylor's series method and compute $y(0.4)$ by Milne's method. 6M

UNIT-IV

8. a) Find the Laplace transform of $te^{-t} \sin 3t$. 6M
- b) Evaluate $L\left\{\int_0^t \int_0^t \int_0^t (t \sin t) dt dt dt\right\}$ 6M

(OR)

9. a) Apply Convolution theorem to evaluate $L^{-1}\left[\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}\right]$. 6M
- b) Solve by using Laplace transforms, the equation $(D^3 - 3D^2 + 3D - 1)y = t^2 e^t$ given $y(0) = 1, y'(0) = 0$ and $y''(0) = -2$. 6M

UNIT-V

10. a) Solve $q^2 = z^2 p^2 (1 - p^2)$. 6M
- b) Solve $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = \cos(2x + y)$. 6M

(OR)

11. a) Solve by the method of separation of variables $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$ where $u(x, 0) = 6e^{-3x}$ 6M
- b) Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ with boundary conditions $u(x, 0) = 3 \sin n\pi x$, $u(0, t) = 0$ and $u(1, t) = 0$, where $0 < x < 1, t > 0$. 6M