

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2019

Course Code: CE465

Course Name: GEO-ENVIRONMENTAL ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

		Marks
1	a) Any four with explanation such as source, characteristics, impacts etc (2 marks each)	8
	b) Various mechanism of soil water interaction mechanism	7
	(A) Chemical mass transfer and attenuation	
	(a) Sorption- contaminant partitioning	
	(b) Dissolution/ precipitation- addition or removal of contaminants	
	(c) Acid-base reaction- proton transfer	
	(d) Redox reaction- electron transfer	
	(e) Hydrolysis/ substitution/ complexation/ speciation- ligand-cation complexes.	
	(B) Mass transport	
	(a) Advection- fluid flow	
	(b) Diffusion- molecular migration	
	(c) Dispersion- mixing	
2	a) Any four- 2 marks each	8
	b) Advection, dispersion, and diffusion etc...-7 mark.	7
3	a) Gasification : partial combustion of carbonaceous material at high temperature forming a gas comprising mainly CO ₂ ,CO,N ₂ ,H ₂ ,H ₂ O,CH ₄ etc which can be used as fuel. Refuse derived fuel: combustible part of waste material separated for burning as fuel. Various physical process such as screening, size reduction, magnetic separation etc are used to separate the combustibles.	5
	b) Ill effects : a) pollution b) congestion c) unpleasant aesthetics d) communicable diseases e) contamination of water f) improper drainage (points with explanation)	6
	c) Pyrolysis: thermal degradation of carbonaceous materials to gaseous, liquid and solid fraction in the absence of oxygen. This occurs at a temperature between 200	4

to 900

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Explanation of compacted clay liners, its function (3) advantages(2) 5
 b) Construction sequence of compacted clay liner (laying, joiningetc.) 10
- 5 a) 5 types – 1 mark each (including figure) 5
 Hazardous Waste Landfills
 Non-Hazardous Waste Landfills
 Inert Waste Landfills / Monofills
 Monofills for high volume waste
 Special Landfills
- b) Figure – 2.5 marks, explanation – 1.5 marks each 10
- 6 a) Landfill gas composition – 1 mark 5
 Need for Management – 1 mark
 Management of gas – venting, flaring, energy utilization – 3 marks
- b) Geosynthetics – definition – 1 marks 5
 Use of Geotextile, Geomembrane , Geonets and GCL as drainage layer filter layer and barrier layer – 4 marks
- c) Items to be included in landfill closure plan – 5 Marks 5

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) List 5 advantages – 5 marks 5
 b) List minimum 6 processes (phytoextraction, phytostabilization, phytodegradation, phytostimulation, phytodesalination)- 9 marks 9
 c) Definition- 2 marks , Explanation of process- 4 marks 6
- 8 a) Yes ,soil washing is not an effective method for treating soils with high fines content 5
 Explanation for the statement.....5 marks
- b) Important data for site remediation 10
 Brief explanation of any 5 data carries 5 marks.
 Site history and land use pattern
 Geologic and hydrologic
 Geotechnical
 Waste
- c) Important points for contamination assessment 5

Brief explanation of any 5 data carries 5 marks.

Determining concentration and spatial distribution of harmful pollutants under consideration.

b) Determining the extent of site remediation (zonation) based on which the suitable remediation technique is selected.

c) For assessing environmental and human health risk due to contamination.

More specifically, CSA is required to answer the following questions:

a) What is the source of contaminants? b) What is the type and physical form of contaminants? c) Spatial and depth wise extent of contamination d) Whether the contaminants are stationery or movable? e) If they are movable, then identify the significant pathway

- 9 a) Explanation of the impact of waste on each property (4 marks each) 12
b) Explanation of the volume change behaviour 8

