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, DECEMBER 2018

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) Brief explanation with neat sketches 8

- Brief Description of clay mineralogy (2)
- Free water, held water& adsorbed water (1.5)
- Ion exchange capacity (2)
- Percolation of water through waste (2.5)

b) Explain any 4 properties with brief notes (1.5 marks each and 2marks for strength property) 7

- Moisture content
- Density
- Unit weight
- Permeability
- Strength parameters/Shear strength
- Particle size
- Compressibility
- Specific gravity
- Compaction

2 a) With neat sketch explain the three phase system 3

b) Any five impacts on environment 5

c) Explanation of any three waste management system 7

3 a) Fly ash is a type of industrial waste by product 5

It is of two types

Class F – contain less than 20% lime

Class C – contain more than 20% lime

It is produced by the burning of coal at electric power plants

b) 1) fills for embankments and other structural works

2) concrete production

3) waste stabilisation and solidification

4) cement clinker production

5) stabilization of soft soils

6) road subsurface construction

7) as aggregate substitute materials

8) mineral filler in asphaltic concrete

9) as liner cover in landfill construction (any five) 5

c) Municipal solid waste (MSW), commonly known as trash or garbage 5

- It includes biodegradable waste, recyclable materials, electronic waste etc
- The composition of municipal solid waste varies greatly from municipality to municipality
- In municipalities which have a well-developed waste recycling system, the waste stream mainly consists of intractable wastes such as plastic film and non-recyclable packaging materials.
- Waste collection is performed by the municipality within a given area.

PART B

Answer any two full questions, each carries 15 marks.

4 a) List 8 components- 2 marks, Explanation of each component –1marks each 8

b) Landfill capacity calculation 7

5 a) Any 3 functions – 1 mark each 3

b) list of classification – 3 marks, explanation – 3 marks 6

c) Any three uses with explanation

6 a) Leachate treatment methods – on-site and off-site methods – each method carries 4 marks 8

b) Different properties of geomembrane - Tensile strength (ASTM D638), Tear 7 resistance (ASTM D1004) ,Puncture resistance (ASTM D4833) , Low-temperature brittleness (ASTM D746) , Stress crack resistance (ASTM D1693) , Permeability , Carbon black content and diffusion (ASTM D1603 and D2663) , Accelerated heat aging (ASTM D573, D1349) , Density (ASTM D1505 or D792) , Melt flow index (ASTM D1238) , Thickness (ASTM D5199) ,Ply adhesion (ASTM D413).

Any 4 properties with description – 7 marks

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explanation of the planning process 6

b) Explanation of any five methods under bioremediation 10

c) List minimum 4 methods- 4

8 a) Listing any 5 advantages and disadvantages of in situ and ex situ remediation 5

b) Methods of ex situ thermal desorption are :High and low temperature thermal desorption. In situ thermal desorption :Power line frequency heating and radio frequency heating.

Naming methods carry 2 marks

Explaining each method carry 8 marks 10

c) In situ vitrification uses electrical power to heat and melt soil, sludge, mine tailings, buried wastes and sediments contaminated with organic, inorganic and metal-bearing hazardous wastes. Thermal desorption and hot gas decontamination are separation technologies. 5

Vitrification destroys or separates organics and immobilizes some inorganics.

9 a) Effect on each properties-explanation 5 marks each 20

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