P. P. SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination

Dec.-2021

SSES3210-Waste Utilization

10.12.2021, Friday Time: 12:30 p.m. to 03:00 p.m. Maximum Marks: 60

Section-I (Total Marks - 30)

Q.1 Short Questions (10)

1.1 Objectives (05)

1.1a When a product is recycled into something of lower quality than its original form, it is called _____.

A Recycling
B Up-cycling
C Down-cycling
D None

1.1b What is included in poisonous waste?

A Sulphides
B Cynides
C Chloride
D Ammonia

1.1c In secured landfill, the sides of designed pit are lined with an _____.

A Semipermeable membrane
B Permeable membrane
C Impermeable membrane
D All of the above

1.1d A plastic bottle that is recycled into a fleece sweater would be example of which cycling?

A Up- cycling
B Down cycling
C Linear cycling
D None

1.1e Which treatment option is least effective in treating sugar industry wastewater?

A Anaerobic digestion + lagoon
B Anaerobic lagoon + stabilization pond
C UASB reactor + Waste stabilization
D Activated sludge process + Trickling filters

1.1f Which of the following is the correct sequence of processing stages in textile manufacturing industry?

A Sizing - desizing - scouring - bleaching
B desizing – sizing - scouring - bleaching,
C scouring - desizing - sizing - bleaching
D Bleaching - desizing – sizing - scouring

1.1g Ultra-filtration has a pore size of approximately _____.

A 0.03 to 10 microns
B 0.002 to 0.1 micron
C 0.001 micron
D > 5 micron

1.1h Dairy wastewater contains high concentration of:

A Nutrients
B Organics

C Inorganics
D All of the above

1.1i About ____ reduction in pollution load and __ reduction in effluent volume in chipper house can be achieved through effluent reuse.
A 80-90% and 70%
B 10-20% and 50%
C 30-40% and 70%
D 50-60% and 80%

1.1j Adsorption or precipitation of contaminants onto the plant roots that are in solution is known as:
A Phytostimulation
B Phytodegradation
C Rhizofiltration
D None

1.2 Answer the Following: (True/False/Short Question/Fill in the Blanks) **(05)**

1.2a Composting can be aerobic and anaerobic. (True/False)

1.2b Synthetic dyes are extensively used in various industries for example in textile, leather, paper, food, cosmetics etc. (True/False)

1.2c Dairy wastewater contains only detergents. (True/False)

1.2d Ion exchange describes a specific chemical process in which unwanted dissolved ions are exchanged for other ions with a similar charge. (True/False)

1.2e Define bleaching.

Q.2 Short Notes (attempt any two) **(06)**

A Dry and oxidizing pyrolysis.

B Describe any 3 waste heat sources and uses of waste heat.

C Cleaner production hierarchy.

Q.3 Explain in detail (attempt any two) **(14)**

A Define landfill. Explain the methods by which landfilling can be done.

B Explain in detail: hyperaccumulators and their properties.

C What are the problems encountered while managing solid waste in India?

Section-II (Total Marks - 30)

Q.1 Short Questions **(10)**

1.1 Objectives **(05)**

1.1a A thermochemical decomposition of organic material at elevated temperatures in the absence of oxygen is:
A Composting
B Pyrolysis
C Incineration
D Phytodegradation

1.1b Syngas is made up of:
A Carbonmonoxide
B Hydrogen
C Smaller amounts of carbon dioxide and methane.
D All of the above

1.1c The energy transfer between the hot fluid and cold fluids is brought about by their complete physical mixing in:
A Direct contact heat exchanger

B Regenerators
C Recuperators
D Boilers

1.1d Which of the following is NOT an example of recuperators type heat exchanger?
A Automobile radiators
B Condensers
C Chemical factories
D Oil heaters for an aero plane

1.1e Incineration process can be used to reduce the original volume of combustible solid waste by:
A 0 – 10 %
B 30 – 40 %
C 50 – 60 %
D 80 – 90 %

1.1f Factor affecting waste heat recovery feasibility:
A Heat quality
B Heat quantity
C Minimum allowed temperature
D All of the above

1.1g Application of plate heat exchanger include:
A Waste heat recovery
B Water heaters
C Free cooling
D All of the above

1.1h _____ are especially suited for high temperature applications with dirty exhausts.
A Recuperators
B Regenerators
C Heat wheels
D All of the above

1.1i _____ emission is cited as an issue from incineration
A Dioxin
B Carbon
C Sulphur
D Nitrogen

1.1j Heat exchanger is defined as:
A An equipment for burning solid waste.
B An apparatus intended to condense vapors to a liquid state from their gaseous state
C A piece of equipment built for efficient heat transfer from one medium to another.
D None of the above

1.2 Answer the Following: (True/False/Short Question/Fill in the Blanks) **(05)**

1.2a Fast pyrolysis yields 60 % bio-oil. (True/False)

1.2b Recuperators can be based on radiation, convection, or combinations. (True/False)

1.2c Economizers are used to recover heat from low to medium temperature exhaust gases for heating liquids. (True/False)

1.2d Heat exchanger is not used in space heating. (True/False)

1.2e Define syngas.

Q.2 Short Notes (attempt any two) **(06)**

A What are the health consequences of poor disposal of industrial solid waste?

B What are economizers?

C Write applications of heat exchangers.

Q.3 Explain in detail (attempt any two) **(14)**

A What do you understand by heat exchangers? Explain any one in detail.

B Define waste heat recovery technologies. Explain recuperators in detail.

C Explain the two tier approach for managing industrial solid waste.