

Please check whether you have got the right question paper.

- N.B:
1. Question no. 1 is compulsory.
 2. Solve any three questions out of remaining five.
 3. Assume data if required and mention the same.
 4. Draw the sketch if required.

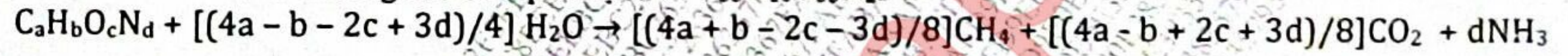
Q.1 Solve any four out of the following: (20)

- A) Explain factors affecting generation rate of solid waste.
- B) Write a note on E - waste.
- C) Why transfer stations are necessary? What are their various types?
- D) Write a note on material recovery facility.
- E) Differentiate SWM in developing & developed nations.

Q.2 A) Explain physical, chemical and biological transformation of solid waste. Explain the importance of transformation in SWM in general. (10)

B) Describe the various types of collection systems employed for House-to-House. Compare the systems and state the best one with reasons. (10)

Q.3 A) Estimate the theoretical volume of methane gas that could be expected from anaerobic digestion of one tone of waste having the composition of $C_{55}H_{10}O_{35}N_2$. (10)



- B) i) Explain in brief about Bio-medical waste management. (05)
- ii) What is leachate? How it is controlled? (05)

Q.4 A) Classify solid waste with respect to source, generation, type and characteristics. (10)

B) Draw a neat sketch of hauled container system and stationary containers system. Explain points of differentiation in both. (10)

Q.5 A) i) Calculate the energy content of solid waste having following composition. (05)

Components	% by mass
Carbon	35
Hydrogen	10
Oxygen	40
Nitrogen	8
Sulphur	3
Ash	4

ii) What are the factors which affect the composting process? (05)

B) i) Explain the functional elements of SWM with neat sketch. (05)

ii) What are the factors to be considered while selecting landfill site. (05)

Q.6 Write short note on any four. (20)

- A) Pyrolysis
- B) Trench method of landfilling.
- C) Vermicomposting
- D) Segregation
- E) Incinerator

- Note: [1] Q.No.1 is compulsory.
 [2] Attempt any three questions out of remaining five questions
 [3] Assume any data if required and mention clearly.

Q.No.1 Attempt any four:-

- (61)
- [a] Define irrigation. What is the necessity of irrigation? [5] 5
 [b] Explain the terms: aquifer, aquiclude and aquifuge. [5] 4
 [c] Describe various methods of computing average rainfall over a basin. [5] 3
 [d] Explain the term 'storage coefficient' and 'coefficient of transmissibility'. [5]
 [e] Explain Canal Lining. [5] 3

Q.No.2 [a] What are the factors affecting Run-off. What are various method of computing run-off? Explain any one method. [10] 6

[b] A canal takes off a reservoir to irrigate the areas given below. 40% of the water required for irrigation is assumed to be available directly from precipitation. Channel conveyance losses are 15%. Reservoir losses are 10%. What would be the capacity of reservoir needed? (The reservoir to be filled only once a year) [10]

Crop	Base period (days)	Duty at the field (ha/cumec)	Area under crop (ha)
Wheat	140	1700	400
Sugarcane	320	800	600
Rice	120	900	300
Cotton	220	1200	1200
Bajra	100	1200	600

Q.NO.3 [a] Explain various types of Rain-gauge with neat sketches. [10] 6

[b] Find the ordinates of a storm hydrograph from a 3hr storm with rainfall of 2, 6.75 and 3.75 cm during subsequent 3 hr intervals. The ordinates of hydrograph are given in the following table:

Hours	3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
Ordinates of Unit hydrograph { cumec }	0	110	365	500	390	310	250	235	175	130	95	65	40	22	10	0

Assume an initial loss of 5 mm, infiltration index of 2.5 mm/hr and base flow of 10 cumecs. [10] 10