

ENVIRONMENTAL ENGINEERING
(CHEN 4133)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) The theme of World Environment Day 2021 was related to:
(a) Ecosystem Restoration (b) Beat Plastic Pollution
(c) Air Pollution (d) Desert & Desertification
- (ii) As per the CPCB standard for Type B water signifies
(a) Untreated Sewage
(b) Water having requisite Bathing Standard
(c) Drinking Water
(d) Treated wastewater for irrigation purpose
- (iii) The RSPM sampler measures
(a) Particulate size more than 50 micron
(b) Particulate size more than 100 micron
(c) Particulate size of 10 micron or less
(d) Particulate size more than 10 micron but less than 30 micron
- (iv) Identify the Environment Act/Rules which is related with genesis of an Apex body on Environment Pollution in India.
(a) Water Act (b) Bengal Smoke Nuisance Act
(c) Air Act (d) E-waste (Management) Rules
- (v) Black water is also termed as
(a) Sullage (b) Grit (c) Moss (d) Sewage
- (vi) The extended aeration system does not require:
(a) Aerator (b) Primary clarifier
(c) Skilled operator (d) Electric Power

- (vii) ISO 14000 series is related to Certification of _____ Standard.
(a) Occupational health & safety
(b) Environmental management
(c) Quality Management
(d) Design of Environment Protection Equipments
- (viii) The Root-zone/Reed Bed Treatment uses
(a) Neem (b) Zoo Plankton
(c) Babul (d) Typha elephantiana
- (ix) Identify the noise level which exceeds 65 db
(a) Whisper (b) a hen's cluck
(c) a normal conversation (d) Rock music
- (x) Trickling Filter is
(a) an attached growth system (b) a suspended growth system
(c) an anaerobic system (d) synonymous with venturi scrubber.

Group- B

2. (a) What do you mean by primary and secondary air pollutants. Give one example of both. [(CO3) (Remember/LOCQ)]
- (b) Calculate the Ambient SPM concentration from the field data obtained in a High Volume sampler:
Average pressure of the day at station level = 712.59 mm of Hg
Average temperature = 30.6C; Sampling rate = Clean filter: 1.6 Cu m/min
Filter after exposure = 1.5 cu. m/min;
Tare weight of filter before exposure = 3.417 g
Tare weight of filter after exposure = 3.925 g
N. B. 1) Sampling time is round the clock; 2) Assume Air as ideal gas.
[(CO3) (Evaluate/HOCQ)]
5 + 7 = 12
3. Discuss the principles and working procedure of a Cyclone Separator with a neat sketch. [(CO3) (Analyze/IOCQ)]
4 + 4 + 4 = 12

Group - C

4. (a) Discuss the methodology of determination of DO using Winkler's Azide Modification method. (CO3) (Analyze/IOCQ)]
- (b) Prove that for a stagnant wastewater system (symbols are usual notations):
Ultimate NBOD = $4.57 \times \text{TKN}$. (CO3)(Evaluate/HOCQ)]
6 + 6 = 12

5. Find L_0 from industrial BOD Data using Fujimoto method.

t (day)	0	1	2	3	4	5	6	7
BOD mg/l	0	55	97	130	156	180	196	204

(CO3) (Evaluate/HOCQ)]

12

Group - D

6. (a) Evaluate the purification methodology of industrial sludge containing Mercury pollution. (CO2) (Evaluate/HOCQ)]

(b) Suggest a suitable method of disposal of Ferro-Chrome slag.

(CO2) (Remember/LOCQ)]

9 + 3 = 12

7. (a) Enumerate different Solid Waste Collection methods practiced in Kolkata Metropolitan Area. [(CO2) (Remember/LOCQ)]

(b) Incineration is rarely practiced as a disposal method in India - Analyze the statement. (CO2) (Analyze/IOCQ)]

6 + 6 = 12

Group - E

8. Discuss the details of Reed Bed and Root Zone Treatment with a neat sketch and explain why it is helpful for small scale industries wastewater treatment.

[(CO3) (Analyze/IOCQ)]

[(4 + 4) + 4] = 12

9. Write Technical notes on:

(i) Ranking of wastewater treatment alternative;

(ii) Environment Management Plan in Pulp & Paper Industries.

[(CO4) (Analyze/IOCQ)]

(6 + 6) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	14.58	50.0	35.42

Course Outcomes (CO):

At the end of the course the students should be able:

1. To apply the knowledge of Legislation concerning Environmental Engineering & Pollution Control prevalent in India.
2. To utilize the knowledge base of Solid Waste Management in order to achieve Swachh Bharat Mission.
3. To solve problems of Air Pollution and Water Pollution in batch and flow system and design suitable instruments/equipments .

4. To design Environmental Management Plan for chemical industries.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question;
HOCQ: Higher Order Cognitive Question

Department & Section	Submission Link
CHE	https://classroom.google.com/c/NDA1NjMxMDk0ODc3/a/NDY0MTk0ODcxMDAw/details