

ENVIRONMENTAL CHEMISTRY (PAC 326)

UNIVERSITY OF FORT HARE

PAC 326

EXAMINATION QUESTION PAPER

November 2017

TIME: 3hours

Subject: environmental Chemistry

Marks:100

This paper consists of 3 pages, including the cover page

Internal Examiner

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External Examiner

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Instructions: Answer all questions

1. Write the correct definition, as it applies to environmental chemistry, for the following terms: [10]
 - a. Biochemical Oxygen Demand (BOD)
 - b. Nitrogen Fixation
 - c. Troposphere
 - d. Mesosphere
 - e. Hydrophobic colloid

2. List a series of common air pollutants. State whether it is expected to have a direct effect or a secondary effect on air quality. [10]

3. Describe the three equations, known as the Chapman Cycle, that are responsible for a steady-state concentration of ozone in the stratosphere.

4. Describe how might acid precipitation dominated by sulphuric acid increase the availability of phosphate, aside from pH effects [6]

5. Briefly give the following the correct definition: [14]
 - (i) Contaminant
 - (ii) Biosphere
 - (iii) Hazardous Waste
 - (iv) Hydrosphere
 - (v) Eutrophication
 - (vi) Wetlands
 - (vii) Photosynthesis

6. Describe the two ways organic carbon is removed from sewage water and give the balanced equations for aerobic and anaerobic degradation of biomass [10]

7. Describe how heavy metals (i.e. , Cd^{2+} , Pb^{2+} and Mn^{2+}) are removed from sewage water in an activated sludge waste water treatment plant(both in the secondary stages and tertiary stages) and give a balanced chemical reaction for lead removal in the tertiary stage. [10]

8. Explain individual classes of water pollutants and their significance. [8]

9. Recycling is a basic application towards the concept of green chemistry revolution.
[12]

(a) What is recycling?

(b) What are the two components of recycling in modern waste reduction?

(c) List down four recyclable materials

(d) How would you recycle the following materials:

(i) Batteries

(ii) Biodegradable waste

(iii) Aggregates and concrete

10. Provide details of the new concepts of renewable energy sources in the modern third world.
[20]