

POLITEKNIK
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION
(MINISTRY OF HIGHER EDUCATION)

CIVIL ENGINEERING DEPARTMENT

FINAL EXAMINATION
JUNE 2012 SESSION

CN102 : ENVIRONMENTAL SCIENCE

DATE : 22 NOVEMBER 2012 (THURSDAY)
DURATION : 2 HOURS (2.30PM – 4.30PM)

This paper consists of **EIGHT (8)** pages including the front page.
Section A: Objective (**20** questions – answer **all** questions)
Section B: Essay (**4** questions – answer **3** questions)

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THE CHIEF INVIGILATOR

(The CLO stated is for reference only.)

SECTION A

OBJECTIVE QUESTIONS (40 marks)

Instruction: This section consists of 15 fill in the blank questions and 5 true and false questions. Write your answers in the answer booklet.

1. Two (2) main types of chemical bonds are _____ and _____. CLO 2 : C1
(2 marks)
2. The molecular weight for $Zn(NO_3)_2$ is _____. CLO 2 : C2
Given atomic weight Zn=65, N=14; O=16 (2 marks)
3. Boyle's Law stated at constant _____, the volume of a definite quantity of dry gas is inversely proportional to the _____. CLO 1 : C1
(2 marks)
4. The _____ is a unit of measurement for the amount of substance or chemical amount, while _____ is the measurement of the chemical substances concentration in moles per liter. CLO 1 : C1
(2 marks)
5. The chemical bonds formed through the _____ and _____ of the electrons. CLO 1 : C2
(2 marks)
6. Three factors that can change a chemical equilibrium are the reactants concentration, _____ and _____. CLO 1 : C2
(2 marks)
7. Personal Protection Equipment (PPE) for student at laboratory are _____, _____ and face shield. CLO 1 : C1
(2 marks)
8. Diseases are transmitted through _____, vector, direct contact and _____. CLO 1 : C1
(2 marks)

9. _____ is a single cell or multicellular plant or plant like organism that contains chlorophyll thus making their own food by _____ process. CLO 1 : C1
(2 marks)
10. Bacteria exists in three principle shapes which are _____, _____ and rod-like spiral shape. CLO 1 : C1
(2 marks)
11. Virus is the microorganism that responsables for causing disease to _____, plants, animal and _____. CLO 1 : C1
(2 marks)
12. Figure 1 and Figure 2 are the signages for _____ hazard and low _____. CLO 1 : C1
(2 marks)



Figure 1



Figure 2

13. The movement of energy from producers to consumers is called a food _____, while _____ cycle is the movement and exchange of organic and inorganic matter back to the production of living matter. CLO 1 : C1
(2 marks)
14. The emergency equipments in the laboratory are eye washer, _____, _____, fire blankets and sand bucket. CLO 1 : C1
(2 marks)
15. _____ is defined as an increase in the rate of supply of organic matter in an ecosystem especially phosphates and _____ that stimulate excessive plant growth. CLO 1 : C1
(2 marks)
16. The nucleus is the smallest particle of element that can participate in a chemical reaction. (TRUE or FALSE) CLO 1 : C1
(2 marks)

17. Silicon, Si has a proton number of 14 and nucleon number of 28, thus the electron arrangement of nitrogen atom is 2.8.4 (TRUE or FALSE) CLO 2 : C2 (2 marks)
18. Electropositivity of an element is the ability of an atom to donate electron to form a positive ion. (TRUE or FALSE) CLO 1 : C1 (2 marks)
19. Biotic components of an ecosystem refer to non-living factors such as pH, temperature, light intensity, humidity and climate. (TRUE or FALSE) CLO 1 : C1 (2 marks)
20. Microorganisms which cause diseases are known as pathogens. (TRUE or FALSE) CLO 1 : C1 (2 marks)

SECTION B**ESSAY (60 marks)**

Instruction: This section consists of **FOUR (4)** essay questions. Answer **THREE (3)** essay questions only.

QUESTION 1

(a) Answer all following questions of the nitrogen and aluminium atoms.

Given: ${}^1_7\text{N}$ and ${}^{27}_{13}\text{Al}$

- | | |
|--|-------------------------|
| i. Find the number of neutron | CLO 1 : C2
(2 marks) |
| ii. Write the electrons arrangement | CLO 1 : C2
(2 marks) |
| iii. Determine the valence electron | CLO 1 : C2
(2 marks) |
| iv. State the Group number | CLO 1 : C2
(2 marks) |
| v. Sketch the atomic electronic structure. | CLO 1 : C2
(7 marks) |
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- (b) Calculate the molecular weight for :
- | | |
|--|-----------|
| i. Nitrous Oxide, N_2O | (2 marks) |
| ii. Aluminium Sulphate, $\text{Al}_2(\text{SO}_4)_3$ | (3 marks) |

[Given the atomic weight : N= 14, O=16, Al=27, S=32]

QUESTION 2

- (a) Convert : CLO 1 : C1
40 cm³/s to mL/hr (2 marks)
- (b) Construct the chemical formula for the following CLO 2 : C2
compounds :
i. Zinc Chloride, given Zn²⁺ , Cl¹⁻ (2 marks)
ii. Natrium Nitrate, given Na⁺ , (NO₃)²⁻ (2 marks)
- (c) Balance the following chemical reactions : CLO 2 : C3
i. CH_{4(g)} + O_{2(g)} → CO_{2(g)} + H_{2O(l)} (2 marks)
ii. Na(s) + Cl_{2(g)} → NaCl(s) (2 marks)
- (d) State **TWO (2)** comparisons between ionic and covalent CLO 2 : C3
bond (4 marks)
- (e) Calculate the Molarity (concentration) of a solution CLO 2 : C3
containing 25 g NaOH in 650 mL volume of water. (6 marks)
[Given :
Moles = mass /molecular weight
Molarity = moles / Liter

QUESTION 3

- (a) Bacteria can be classified by its nutritional status which is describing how the organisms obtain the energy and carbon. The classification also can be made base on their relationship with oxygen. Two main classification are heterotrophs and autotrophs: CLO 2 : C2
- Define:
- i. Heterotrophs (3 marks)
 - ii. Autotrophs (3 marks)
- (b) Describe briefly : CLO 1 : C1
- i. Protozoa (2 marks)
 - ii. Algae (2 marks)
 - iii. Fungi (2 marks)
 - iv. Bacteria (2 marks)
 - v. Virus (2 marks)
- (c) Name **TWO (2)** types of the microorganisms and the diseases that can be transmitted from one individual to another. CLO 2 : C2 (4 marks)

QUESTION 4

- (a) State **THREE (3)** types of nutrient cycle. CLO 2 : C2
(3 marks)
- (b) Define: CLO 1 : C2
- i. Ecology (3 marks)
 - ii. Abiotic (3 marks)
 - iii. Biotic (3 marks)
- (c) Eutrophication can occur through the introduction of high levels of nutrients due to some factors. CLO 2 : C3
- i. State **TWO (2)** factors that can causes eutrophication problems. (2 marks)
 - ii. Explain the effects of eutrophication to the environment. (6 marks)