

Second-year Test on first-year material (with answers) February 2005

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Pages: 12 (including cover sheet)

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Target: Second-year students taking Environmental Science

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**UNIVERSITY OF MALTA
GF Abela Junior College
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**SECOND YEAR TESTS
February Session 2005**

Environmental Science

February 2005

Time: 45 minutes

Directions to Candidates

- *You are required to answer ALL questions in this test.*
 - *Each correct answer carries one mark. No marks shall be deducted for incorrect answers.*
 - *The use of electronic calculators is permitted.*
 - *Answers to Section A should be filled in on the attached answer sheet. Answers that you consider to be correct should be indicated by a ✓ symbol in the appropriate space in the answer sheet.*
 - *Should an answer be erroneously indicated as correct, the entire space so indicated is to be filled in with solid colour. The space corresponding to the correct answer should subsequently be indicated.*
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- 1) Primary pollutants are those that are
 - a) released directly in dangerous forms.
 - b) produced in the greatest quantities.
 - c) the most dangerous.
 - d) the most threatening to people.

- 2) Secondary pollutants
 - a) harm only vulnerable members of a population.
 - b) become dangerous after reacting in the atmosphere.
 - c) are produced in lesser quantities.
 - d) are less dangerous than others.

- 3) _____ are examples of secondary pollutants.
 - a) Aerosols
 - b) Volatile organic compounds
 - c) Photochemical oxidants
 - d) Combustion gases

- 4) Fugitive emissions are produced by
 - a) smokestacks.
 - b) power plants and other heating equipment.
 - c) reactions between pollutants and atmospheric gases.
 - d) strip mining, rock crushing, and other dust-producing activities.

- 5) The term NO_x is often used because
 - a) there are many different oxides of nitrogen.
 - b) it is usually unclear how oxidised nitrogen is.
 - c) NO₂ and NO easily convert into each other.
 - d) many different molecules often attach to NO.

- 6) The brown haze in smog is caused by
 - a) sulphuric acid.
 - b) NO₂.
 - c) carbon monoxide.
 - d) chlorofluorocarbons.

- 7) 11. A common example of a photochemical oxidant is
 - a) NO₂.
 - b) H₂S.
 - c) CO₂.
 - d) methane.

- 8) Carbon monoxide is produced by
 - a) normal respiration.
 - b) the burning of sulphur-laden coal.
 - c) incomplete burning of fuels.
 - d) photochemical oxidation of carbon.

- 9) The most common metallic air pollutant is
 - a) iron.
 - b) cadmium.
 - c) lead.
 - d) mercury.

- 10) Lead is dangerous because it acts as a(n)
- neurotoxin.**
 - asphyxiant.
 - irritant.
 - respiratory fibrotic agent.
- 11) An aerosol is
- a chemical propellant.
 - a rigidly defined chemical composition.
 - any liquid droplet or solid particle suspended in air.**
 - liquids condensing from air on leaves.
- 12) The most dangerous air-borne particulates are those
- large enough to damage skin and eyes.
 - small enough to breathe.**
 - produced by artificial means.
 - that are liquid.
- 13) A major source of VOCs is
- incomplete burning of hydrocarbons.**
 - combustion of sulphur-containing fuel.
 - photochemical oxidation.
 - decaying organic matter.
- 14) Photochemical oxidation reactions are driven by
- the great instability of the reactants.
 - the heat of industrial activity.
 - solar energy.**
 - entropy.
- 15) Ozone is produced by
- incomplete burning of fuels.
 - combustion of sulphur-containing fuel.
 - decaying organic matter.
 - photochemical oxidation.**
- 16) _____ ozone is harmful, damaging plants and human health while ozone at the _____ level screens out mutagenic ultraviolet radiation.
- Stratospheric, troposphere
 - Thermospheric, mesosphere
 - Tropospheric, stratosphere**
 - Mesospheric, thermosphere

- 17) The "ozone hole" is a depletion currently most serious
- at the most populated latitudes.
 - over North America.
 - in tropical latitudes.
 - near the poles.**
- 18) Pollutants such as chlorofluorocarbons deplete atmospheric ozone
- when nitrogen combines with O_3 to form NO_x .
 - when chlorine-containing molecules are oxidised at the expense of O_3 .**
 - because chlorine is most stable as ClO_3 .
 - All of these are correct.
- 19) There are serious signs that ozone depletion may lead to
- UV-caused skin cancers.
 - UV-caused blindness.
 - IR-caused sunburn.
 - a and b only.**
- 20) The most common human health response to air pollution is
- inflammatory responses in sensitive tissues.**
 - lung cancer.
 - blindness caused by deteriorating eye tissues.
 - skin cancer.
- 21) Levels of tropospheric ozone are higher in summer than in winter because
- More people use cars during summer
 - There is more light during summer**
 - Measuring instruments are slightly less accurate during summer
 - Both a and b are correct
- 22) Acid precipitation often occurs downwind from _____ industries.
- dust-producing
 - coal-burning or smelting**
 - wood product
 - hydropowered manufacturing
- 23) On a pH scale, pH 4 is _____ as pH 8.
- half as acidic
 - ten times as acidic
 - 100 times as acidic
 - 10,000 times as acidic**
- 24) One of the principal ways lakes suffer from acid deposition is that
- rocks on the bottom begin to dissolve.
 - fish eggs die and fish populations fall.**
 - aquatic vegetation turns yellow.
 - plants grow excessively and choke other life.

- 25) The discharge from a nonpoint source of pollution is
- usually constant throughout the year.
 - generally easier to regulate than a point source.
 - usually less polluting than point sources.
 - highly seasonal in quantity.**
- 26) Atmospheric deposition of contaminants is an excellent example of
- the properties of water that allow it to disperse contaminants.
 - nonpoint pollution.**
 - a point source of pollution.
 - the relative ease in determining sources of contaminants.
- 27) Streams and lakes are especially sensitive to acid deposition when
- fish populations are already small.
 - soils and rocks provide little buffering capacity.**
 - they are alkaline, with calcium-rich bedrock.
 - they lie in hot, dry regions.
- 28) High altitude forests are especially susceptible to acid deposition because
- acidic clouds surround them much of the time.**
 - high winds blow acids into leaf tissues.
 - low moisture levels fail to dilute acids.
 - high altitude species are especially delicate.
- 29) What type of buildings and monuments are most susceptible to acid damage?
- granite and basalt
 - wood
 - limestone and marble**
 - concrete and brick
- 30) Electrostatic precipitators prevent fly ash escape by
- filtering them.
 - using electrodes to give particles an electrostatic charge.**
 - preventing their production in the first place.
 - gravity.
- 31) Cars use _____ to reduce nitrogen oxide emissions.
- afterburners.
 - electrostatic precipitators.
 - fluidised bed combustion.
 - catalytic converters.**
- 32) Mixing limestone with coal can reduce sulphur emissions because the limestone's
- pH decreases the acidity of the sulphur dioxide.
 - calcium bonds with the sulphur to make gypsum.**
 - particle size filters out the sulphur.
 - burning temperature completely combusts sulphur.
- 33) Hydrocarbon emissions are produced mainly by _____ industries.
- coal-burning
 - cement manufacturing
 - chemical and solvent**
 - nuclear power

- 34) Among the most important characteristics of chemicals in determining their environmental risks is/are
- solubility.
 - persistence.
 - reactivity.
 - All of these.
- 35) Bioaccumulation is a term that describes the way cells
- grow as they absorb all types of molecules.
 - selectively absorb and store molecules.
 - allow water-soluble compounds to pass through membranes.
 - metabolise compounds that are absorbed.
- 36) Bioaccumulation is important because it allows cells to
- accumulate essential nutrients and minerals.
 - rid themselves of waste material.
 - protect themselves against toxins.
 - reproduce more quickly.
- 37) Biomagnification is a concentration of toxins
- within certain cells of the body.
 - as predators consume and store toxins stored in the bodies of their prey.
 - within the liver as an organism gets older.
 - within the bodies of organisms at low trophic levels.
- 38) Highly persistent toxic chemicals
- retain their toxicity as they cycle through the food chain and environment.
 - quickly lose their toxicity once released in the environment.
 - accumulate within one organism but break down at higher trophic levels.
 - are highly unusual among artificial chemicals.
- 39) A chemical interaction in which one substance exacerbates the other is termed
- bioaccumulation.
 - an antagonistic reaction.
 - an additive reaction.
 - synergism.
- 40) Motor oil can be toxic at concentrations of only 1 part per million, which means that _____ of fresh water.
- 1 quart of oil can pollute 1 million gallons
 - 1 litre of oil can pollute 4 million litres
 - 1 barrel of oil can pollute 1 million gallons
 - 1 quart of oil can pollute 1 million quarts
- 41) Which of the following is not one of the principal greenhouse gases?
- CFCs
 - Methane
 - Water vapour
 - Oxygen

- 42) Which of the following is the most **potent** greenhouse gas?
- CFCs**
 - Methane
 - Carbon Dioxide
 - Ozone
- 43) Which of the following gases contributes most to the greenhouse effect?
- CFCs
 - Methane
 - Carbon Dioxide**
 - Ozone
- 44) Phytotoxic effects are:
- Deleterious effects on plants**
 - Deleterious effects on soil organisms
 - Deleterious effects on amphibians
 - Deleterious effects on fish
- 45) Which of the following are sources of greenhouse gases?
- Landfills
 - Deforestation and fires arising from deforestation
 - Gut fermentation in livestock
 - All of these are sources of greenhouse gases**
- 46) Which of the following are possible consequences of global warming?
- Salinisation of soils
 - Rising sea-levels
 - Species migration and extinction
 - All of these are possible consequences of global warming**
- 47) Which of the following is an ozone depleting gas?
- Oxygen
 - Carbon dioxide
 - NO_x**
 - H₂O
- 48) Which of the following is an ozone depleting gas?
- Nitrogen
 - Chlorofluorocarbons**
 - Carbon monoxide
 - Water vapour
- 49) Smog formation is enhanced by:
- Topographic features such as valleys or basins surrounded by highlands
 - Temperature inversion and static air masses
 - Formation of secondary pollutants such as NO_x and VOCs
 - All of these enhance the formation of smog**
- 50) Which of the following is used to control emissions of suspended particulate matter from power stations?
- Scrubbers
 - Electrostatic precipitators**
 - Catalytic converters
 - All of these

- 51) Which of the following is used to control emissions of SO₂ from power stations?
- a) **Scrubbers**
 - b) Electrostatic precipitators
 - c) Catalytic converters
 - d) All of these
- 52) Which of the following is used to control emissions of CO from cars?
- a) Scrubbers
 - b) Electrostatic precipitators
 - c) **Catalytic converters**
 - d) All of these
- 53) Which of the following is used to control emissions of VOC from cars?
- a) Scrubbers
 - b) Electrostatic precipitators
 - c) **Catalytic converters**
 - d) All of these
- 54) Which of the following methods of pollution abatement can reduce levels of acid precipitation?
- a) **Scrubbers**
 - b) Electrostatic precipitators
 - c) Catalytic converters
 - d) All of these
- 55) Which of the following methods of pollution abatement can reduce incidence of fibrosis of the lungs?
- a) Scrubbers
 - b) **Electrostatic precipitators**
 - c) Catalytic converters
 - d) All of these
- 56) Which of the following methods of pollution abatement can reduce localised accumulations of tropospheric ozone?
- a) Scrubbers
 - b) Electrostatic precipitators
 - c) **Catalytic converters**
 - d) All of these
- 57) Which of the following methods of pollution abatement can reduce acidification of lakes?
- a) **Scrubbers**
 - b) Electrostatic precipitators
 - c) Catalytic converters
 - d) All of these
- 58) Which of the following methods of pollution abatement can reduce corrosion rates of limestone monuments?
- a) **Scrubbers**
 - b) Electrostatic precipitators
 - c) Catalytic converters
 - d) All of these

- 59) Which of the following methods of pollution abatement can reduce rates of respiratory disease?
- Scrubbers
 - Electrostatic precipitators
 - Catalytic converters
 - All of these**
- 60) How much energy does a 100-watt bulb use up in 1 hour?
- 360,000 joules**
 - 100 joules
 - 60 joules
 - 360 joules
- 61) The genetic code:
- Is the instructions found on the DNA, which code for an organism
 - Is found inside the cell
 - Is found within the chromosomes
 - All of the above**
- 62) A compound consists of:
- Two or more atoms chemically combined together**
 - Two or more mixtures chemically combined together
 - A mixture of two or more similar elements
 - A mixture of two or more different elements
- i) Consider the unbalanced chemical equation $w\text{Pb}(\text{NO}_3)_2 + x\text{KI} \rightarrow y\text{KNO}_3 + z\text{PbI}_2$. The symbols **w**, **x**, **y**, and **z** represent integers that should be incorporated in order to balance the equation.
- 63) What is the value of **w** in the above equation?
- 1**
 - 1.5
 - 2
 - 3
- 64) What is the value of **x** in the above equation?
- 1
 - 1.5
 - 2**
 - 3
- 65) What is the value of **y** in the above equation?
- 1
 - 1.5
 - 2**
 - 3
- 66) What is the value of **z** in the above equation?
- 1**
 - 1.5
 - 2
 - 3

67) What chemical compound does the formula CaCO_3 represent?

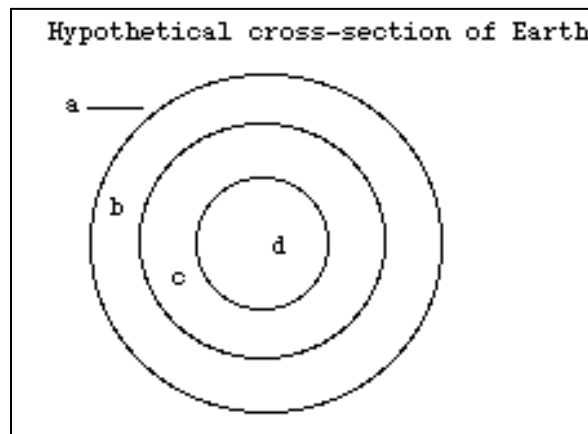
- a) Glucose
- b) Methane
- c) **Calcium carbonate**
- d) Ammonia

68) What chemical compound does the formula $\text{C}_6\text{H}_{12}\text{O}_6$ represent?

- a) **Glucose**
- b) Methane
- c) Calcium carbonate
- d) Ammonia

69) What chemical compound does the formula CH_4 represent?

- a) Glucose
- b) **Methane**
- c) Calcium carbonate
- d) Ammonia



70) In the diagram above representing a cross-section of the Earth, the mantle is labelled

- a) a.
- b) **b.**
- c) c.
- d) d.

71) In the above diagram, the most dense part of the Earth is labelled

- a) a.
- b) b.
- c) c.
- d) **d.**

72) In the above diagram, the part of the Earth that is composed mainly of oxygen, silicon, and aluminium is labelled

- a) **a.**
- b) b.
- c) c.
- d) d.

- 73) _____ in the mantle make tectonic plates move.
- Conduction movements
 - Earthquakes
 - Radioactive decay
 - Convection currents**
- 74) "Subduction" is the process of a tectonic plate
- falling freely into the mantle.
 - being forced below another plate.**
 - melting without moving.
 - sliding alongside another plate.
- 75) Which of the following statements regarding tectonics is true?
- As a result of tectonic movements, Europe and Africa are drifting slowly toward the Americas.
 - When continental plates collide with continental plates, both plates usually subside.
 - When oceanic plates collide with continental plates, the continent usually rides up over the seafloor**
 - As a result of tectonic movements, the Pacific Ocean is slowly increasing in size.
- 76) The "ring of fire" is the source of more earthquakes and volcanic activity than any other place on Earth. What causes the ring of fire?
- the subduction of Pacific plates under continental plates**
 - the drift of Europe and Africa away from the Americas
 - the collision of two continental plates
 - mid-oceanic ridges
- 77) Rocks are _____ in the process called the rock cycle.
- moved from place to place
 - incorporated into living organisms
 - broken down and re-formed**
 - cycled through the core and mantle
- 78) A mineral is composed of
- other minerals.
 - any noncrystalline elements.
 - inorganic elements.**
 - organic material.
- 79) Rock formed from magma extruded to the surface through volcanic vents is classified as
- sedimentary.
 - igneous.**
 - metamorphic.
 - evaporitic.
- 80) The selective removal or alteration of specific components of a rock that leads to its weakening is called
- the rock cycle.
 - sedimentation.
 - chemical weathering.**
 - mechanical weathering.