Earth and Environmental Science

General course

Marking key for the Externally set task

Sample 2016

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# Earth and Environmental Science

## Externally set task – marking key

1. A mining company has obtained a lease on an area of land in Western Australia where it plans to conduct exploration for possible ore deposits. **(26 marks)**

(a) Preliminary investigation of the area could yield some valuable information about the likelihood of ore deposits underground. Describe **two (2)** surface features that would provide information that a geologist could use from walking of a possible mineral deposit site

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Surface rocks, stream beds, vegetation, any reasonable feature 1 each | 2 x 1 |
| **Total** | **2** |

(b) Name and describe **two (2)** exploration techniques that the company might use in its search for an ore body.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Name method: magnetic survey, gravity survey, soil sampling, stream sampling or other 1 each x 2 | 2 |
| Describe method x 2 | 2 |
| Identify the type of information that is yielded x 2 | 2 |
| **Total** | **6** |

(c) If a large ore body is discovered close to the surface, name and describe the type of mining operation that is most likely to be undertaken.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Open cut mine | 1 |
| A large open hole is dug and ore removed by trucks | 1 |
| **Total** | **2** |

(d) Describe **three (3)** impacts that this type of mining operation is likely to have on the local environment.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Land clearing destroys habitat  Removes food sources  Kills indigenous plants  Alters water table  Creates dust  Any 3 x 1 | 3 |
| **Total** | **3** |

(e) Identify **three (3)** procedures that could be undertaken before mining commences which will assist with the rehabilitation of the area after mining ceases.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Collect seeds, relocate animals, scrape topsoil and set aside for later, survey the existing ecosystem  1 each x 3 | 3 |
| **Total** | **3** |

Mining activities can also impact on communities living close to where the mine and mining activities are located.

(f) Describe **three (3)** impacts that mining operations could have on the people living in the nearby town.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Noise, dust, traffic congestion, demand for services or resources such as water, any reasonable impact associated with mining  1 mark each x 3 | 3 |
| **Total** | **3** |

(g) Describe **three (3)** strategies that could be used to limit the impact on people living near the mining operations.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Noisy operations such as blasting only conducted between certain hours | 1 |
| Dust watered down on a regular basis | 1 |
| Construction of alternative routes for trucks | 1 |
| Provision of services (accommodation, food, fuel) for employees  or other reasonable strategy  maximum 3 x 1 mark each |  |
| **Total** | **3** |

(h) After a mine has become uneconomical, it is closed. List **four (4)** steps involved in the rehabilitation of a mine site after the permanent closure of the mine.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Waste is removed | 1 |
| Site is levelled | 1 |
| Topsoil is replaced | 1 |
| Vegetation is planted, or other reasonable step | 1 |
| **Total** | **4** |

1. Plan an investigation which will enable the horticulturist to decide whether it is worth the expense to apply smoke water to the seeds. **(13 marks)**

(a) Write a hypothesis for the investigation.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Smoke water will make more seeds germinate (or less), or  Smoke water will make the seeds germinate faster (or slower)  1 for smoke water; 1 for germination effect | 1  1 |
| **Total** | **2** |

(b) Write a step by step procedure for carrying out the investigation.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| 1. plant hundreds of seeds under the same conditions | 1 |
| 2. water half of them with normal water | 1 |
| 3. water the rest with smoke water | 1 |
| 4. observe each day for at least 4 weeks | 1 |
| 5. record the numbers of seeds germinating in each | 1 |
| **Total** | **5** |

(c) Variables

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Independent variable: smoke water | 1 |
| Dependent variable: germination rate | 1 |
| Controlled variables: soil type, depth of planting, amount of water, light, temperature, other reasonable factors  1 each x 4 | 4 |
| **Total** | **6** |

(d) Draw and label a table for recording your results.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| 1 column for time | 1 |
| 1 column for controlled condition seed germination | 1 |
| 1 column for smoke water seeds germination | 1 |
| **Total** | **3** |

1. Mel and Ben are on a field trip and they come across a shaley rock that breaks into parallel layers. On close examination, Mel notices an impression of a leaf on the surface of the rock. **(8 marks)**

(a) Describe how this leaf impression was formed. Use a flow diagram to illustrate your answer.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| It is a fossil | 1 |
| Formed when leaf fell onto a surface and was quickly covered by sediment | 1 |
| After further burial and time passing | 1 |
| Sediment solidified | 1 |
| Flow diagram showing leaf being covered by sediments | 2 |
| **Total** | **6** |

(b) What information could scientists gain from this rock in terms of the conditions that prevailed when the rock was formed?

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Land plants were growing in this area | 1 |
| If plant is identified, scientists can tell whether conditions were tropical or cold climate. | 1 |
| **Total** | **2** |

1. Barrow Island has an oil and gas extraction facility in a Class A nature reserve. The mining operations and its associated activities are carefully managed to protect the flora and fauna in the reserve.

**(13 marks)**

(a) There is a concern that if food waste is put out in normal bins, it will affect the behaviour of native animals in the area. Describe how this would occur.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Animals could be attracted to bins | 1 |
| Then become dependent on scraps | 1 |
| Would stop eating their normal diet | 1 |
| **Total** | **3** |

(b) Food waste is dried in industrial ovens before it is removed from the island by boat. Give **two (2)** reasons why this process is followed.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Prevents bacteria growing in the waste | 1 |
| So decreases health risks | 1 |
| Also makes the waste less bulky and lighter | 1 |
| So it is less expensive to transport to the mainland | 1 |
| **Total** | **4** |

(c) The mining industry is important to the State’s economy. List **three (3)** job types that are directly involved in the mining industry.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Geologist, engineer, mechanic, electrician, environmental scientist, health and safety, operator, driller, truck driver, field hand or any other appropriate job  1 each x 3 | 3 |
| **Total** | **3** |

(d) Identify **three (3)** industries that that supply services to the mining industry.

|  |  |
| --- | --- |
| **Description** | **Marks** |
| Cleaners, caterers, clerical and administrative, trucking, airlines, accommodation, mechanics, construction, health provision, occupational safety or other appropriate services  1 each x 3 | 3 |
| **Total** | **3** |