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**ENVIRONMENTAL MANAGEMENT**

**5014/01**

Paper 1 Theory

**For examination from 2019**

MARK SCHEME

Maximum Mark: 80

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**Specimen**

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This document consists of **15** printed pages and **1** blank page.

## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

### GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

### GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

### GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

### GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

### GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

**Key**

;	separates alternative responses to the question
/	separates alternative wording within the same response
<b>OR</b>	separates possible variants in a response which are mutually exclusive (award marks for one <b>OR</b> the other, <b>not</b> parts of each)
AVP	any valid point
owtte	or words to that effect
<u>underlined</u>	underlined words must be included to gain credit for a response

Question	Answer	Marks
1(a)	<i>any three from:</i> when fuels burn/volcanoes erupt; SO <sub>2</sub> /NO <sub>x</sub> are released; dissolve in/mix with/react with/combine with water (vapour) or rain; falls as rain with low pH; named acid;	<b>3</b>
1(b)	acidification of bodies of water/reduces fish populations/damage to crops and vegetation/damage to buildings;	<b>1</b>
1(c)	<i>any two from:</i> gases can be moved long distances/atmosphere is not a barrier to gas movement; gases move by winds; gases produced in one country can affect other countries;	<b>2</b>

Question	Answer	Marks
2(a)	surface mining/opencast/open-pit/open-cut/strip mining/quarrying;	<b>1</b>

Question	Answer	Marks
2(b)	<p><i>any one from:</i></p> <p><i>positive effect:</i> employment opportunities; improvements in local or national economy; improvement in facilities or infrastructure;</p> <p><i>any one from:</i></p> <p><i>negative effect:</i> loss of habitat; noise / water / land / air / dust / visual pollution; production of waste;</p>	2
2(c)	<p><i>any two from:</i></p> <p>increased efficiency of extraction; increased efficiency of use; increased recycling; legislation;</p>	2

Question	Answer	Marks
3(a)	<u>female</u> mosquito;	1
3(b)	<p><i>max two from either part:</i></p> <p><i>methods of control:</i> avoid contact with the mosquito or vector / avoid getting bitten / kill the mosquito or vector using insecticide / killing the parasite by use of drugs / drain standing water / cut grasses / cover water / introduce fish / suitable examples e.g. use of nets, cover body / AVP;</p> <p><i>avoiding spread:</i> controlling the vector / breaks the lifecycle of the parasite or <i>Plasmodium</i>; eventually all individuals of that parasite die out or / eventually leaves a disease-free population;</p>	3

Question	Answer	Marks
4(a)	<i>any two from:</i> temperature; humidity; water; oxygen; salinity; light; pH;	<b>2</b>
4(b)	<u>secondary</u> consumer;	<b>1</b>
4(c)	<i>any two from:</i> creation of: national parks; wildlife / ecological reserves and corridors; world biosphere reserves; marine protected area;  sustainable tourism and ecotourism qualified;	<b>2</b>

Question	Answer	Marks
5(a)(i)	X = constructive / divergent / diverging; Y = destructive / convergent / converging;	<b>2</b>
5(a)(ii)	<i>any three from:</i> most tectonic activity being concentrated on plate boundaries; earthquakes are strongest at plate boundaries; plates are moving; reference to ripple effect e.g. strength gets less moving away;	<b>3</b>

Question	Answer	Marks
5(b)(i)	2004 to 2007; includes top three years for earthquake numbers;  <i>use of data:</i> 7 in 2004, 10 in 2005, 6 in 2006 and 4 in 2007 / 27 of the total number of 43 in this 4-year period / owtte;	3
5(b)(ii)	the risk is (very) high / since at least one earthquake of magnitude 6.0 or more occurred in every year / since the average in the 10-year period was more than four strong earthquakes a year;	1

Question	Answer	Marks
6(a)(i)	ocean location where sea water heats up most / is warm around the Equator / ocean temperature is at least 27 °C; ocean depth is at least 60 m; further details about how this triggers off rising air currents / leading to condensation of water vapour / formation of towering cumulonimbus clouds / formation of deep area of low pressure;	3
6(a)(ii)	(end of summer season) when sea water temperatures are at their highest / sea water takes a long time to heat up;	1
6(b)(i)	<i>any two from:</i>  <i>evidence for heavy rainfall:</i> (severe) flooding (everywhere); flash floods; (most of the dead were) from drowning; houses swept into rivers and out to sea;	2
6(b)(ii)	<i>any one from:</i>  island nature of the country so very vulnerable to effects of cyclones; cyclones happen frequently; the country is one of the closest land areas to the source; reference to the way the tracks of the cyclones bend northwards;	1

Question	Answer	Marks
6(b)(iii)	<p>conclusion based on evidence;</p> <p><i>any six from:</i></p> <p><i>max four from:</i></p> <p><i>physical factors:</i>  wind strength was too weak;  to trigger mobile phone text messages;  great wind strength usually expected from typhoons hitting the Philippines;  but on this occasion it was flooding which did the damage;  massive amounts of rainwater must have fallen to make the rivers flood so badly showing the force of nature;  its non-predictability/all natural hazard events are different;  Cagayan de Oro geographical factors of steep-sided mountains;  proximity to the sea;  deforested slopes*;</p> <p><i>max four from:</i></p> <p><i>human factors:</i>  poverty meant slum houses / poor quality houses have been built;  lack of planning leads to building on sand banks in the middle of the river;  lack of money spent by government, with examples such as to build shelters;  lack of flood defences;  despite previous warnings about a location between steep mountain sides and the sea;  lack of sending advance warnings;  not looking at advance weather information;  lack of shelters;  deforested slopes*;</p> <p><i>max two from:</i></p> <p><i>or a mixture of the two:</i>  can never prevent large losses of life from natural hazards;  on the other hand, the Philippines should have been much better prepared, especially considering that typhoons are regular events and there is a known time of the year when they will occur;</p> <p>* credit once only</p>	7



Question	Answer	Marks
7(a)	<p><i>any three from:</i></p> <p>millions of years ago;  plants and animals or plankton or sea creatures died or fell to bottom of sea;  covered by (layers of) mud or sediment;  this increased the temperature and pressure;  this changed the animal and plant remains into crude oil;</p>	<b>3</b>
7(b)(i)	<p>3.3 bar line correctly completed;  <math>\pm\frac{1}{2}</math> small square tolerance</p>	<b>1</b>
7(b)(ii)	<p>0.06;</p>	<b>1</b>
7(b)(iii)	<p><i>any one from:</i></p> <p>flow rate might change each day;  the duration of the spill is an estimate / the 85 days is an estimate;  some oil might not have leaked out before the main leak was detected;  some oil might have continued to leak after the well was capped;</p>	<b>1</b>
7(c)	<p><i>max two from reference to areas of impact shown on the source map:</i></p> <p>sea turtles / birds;  wetlands;  marine mammals / fisheries;</p> <p><i>comment on how areas or organisms are impacted:</i>  any suitable explanation on how organisms are impacted;  physical smothering;  chemical toxicity;  ecological changes;  indirect effects e.g. loss of habitat or shelter;  impact of clean-up process;</p>	<b>4</b>

Question	Answer	Marks
7(d)	<p><i>any two from:</i></p> <p>floating booms; detergent sprays; dispersants; skimmer ships; controlled burning of surface oil;</p>	<b>2</b>
7(e)	<p><i>any three from:</i></p> <p>expensive to switch to non-renewables e.g. new plant and machinery; investment/current contracts with e.g. oil companies; renewables transfer less energy; renewables are not constant; public opposition to change; location of renewable plants may be unpopular; country may not have suitable renewable sites e.g. tidal (inland country), wind (low-lying land); some countries are rich in fossil fuel reserves; resistance to accept scientific evidence; energy resources is a global issue/it is difficult to get international agreement;</p>	<b>3</b>

Question	Answer	Marks
8(a)(i)	<p>Bulgaria –4.6 minus sign needed AND Pakistan (+) 17.9;</p>	<b>1</b>
8(a)(ii)	<p>population will decline;</p>	<b>1</b>

Question	Answer	Marks
8(a)(iii)	<p><i>any two from:</i></p> <p>parental choice for lower families;            better access to birth control;            better education for girls and boys;            more opportunities for women to work outside the home;            careers mean potential parents are delaying starting a family;            cost of living is high, this discourages large families;            long working hours are expected / non-family friendly working conditions;            (perceived) antinatalist policies;</p>	<b>2</b>
8(b)	<p><i>axes labels:</i> y-axis birth and death rate per 1000 people and x-axis country;  <i>axes scale:</i> sensible linear scale for y-axis using half the graph paper;  <i>key:</i> death rate and birth rate;  <i>plotting:</i> bar plotting; <math>\pm\frac{1}{2}</math> small square tolerance</p>	<b>4</b>
8(c)(i)	<p>key completed correctly;            top = low population density            middle = medium population density            bottom = high population density</p>	<b>1</b>

Question	Answer	Marks
8(c)(ii)	<p><i>any one from:</i></p> <p><i>attracts:</i>  temperature / climate;  low-lying / fertile land;  natural resources;  political stability / national policies;  availability of jobs / high wages;</p> <p><i>any one from:</i></p> <p><i>discourages:</i>  (extreme) climate;  mountainous / highland land;  dense vegetation;  conflict / political instability / national policies;  lack of jobs / low wages;</p>	<b>2</b>

Question	Answer	Marks
9(a)(i)	unwanted fish/species caught during fishing for different species / capture of non target species;	<b>1</b>
9(a)(ii)	<p><i>any one from:</i></p> <p>for sustainable management of fisheries;  high level of mortality in bycatch;  to understand the effects of fishing on each fish species;</p>	<b>1</b>

Question	Answer	Marks												
9(b)	column or row headings; unit or percentage; 5 sets of data recorded correctly; <table border="1" data-bbox="302 336 981 651"> <thead> <tr> <th data-bbox="302 336 551 387">fishery type</th> <th data-bbox="551 336 981 387"><u>percentage</u> or <u>%</u> mortality rate</th> </tr> </thead> <tbody> <tr> <td data-bbox="302 387 551 438">crab pot</td> <td data-bbox="551 387 981 438">45–100</td> </tr> <tr> <td data-bbox="302 438 551 489">groundfish trawl</td> <td data-bbox="551 438 981 489">90–100</td> </tr> <tr> <td data-bbox="302 489 551 541">domestic trawl</td> <td data-bbox="551 489 981 541">10–42</td> </tr> <tr> <td data-bbox="302 541 551 592">longline</td> <td data-bbox="551 541 981 592">32–50</td> </tr> <tr> <td data-bbox="302 592 551 643">shrimp</td> <td data-bbox="551 592 981 643">100</td> </tr> </tbody> </table>	fishery type	<u>percentage</u> or <u>%</u> mortality rate	crab pot	45–100	groundfish trawl	90–100	domestic trawl	10–42	longline	32–50	shrimp	100	<b>3</b>
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9(c)	<p><i>indicative content discussion of:</i></p> <p>strategies for sustainable management include:  net types and mesh size and specific targeted methods e.g. pole and line  quotas  closed seasons  protected areas and reserves  conservation laws  international agreements</p> <p>however, implementation and monitoring dependent on accurate reporting e.g. accuracy of bycatch recording/observance of international agreements/not all nations are members of the Regional Fisheries Management Organisation and are not bound by its rules  evidence from bycatches shows high mortality rates  world population growing so more demand for increased quantity and variety of food  overfishing depletes reserves of fish  bycatch and overfishing depletes population of young fish  it is difficult to get international agreements/difficult to regulate fishing in international waters</p> <p>Do not expect every aspect to be covered, even for answers in the top level.</p> <p>Level 3: 5–6 marks  Reaches a conclusion based on evidence from both sides.  Gives a detailed description of the strategies for the sustainable harvesting of marine species and also give a detailed description of the factors that mean harvesting is not sustainable. The descriptions may be more detailed on one side than the other.  Some strategies and factors should include a detailed explanation.</p> <p>Level 2: 3–4 marks  <b>Either</b>  Gives a description of the strategies for the sustainable harvesting of marine species and also give a description of the factors that mean harvesting is not sustainable. The descriptions may be more detailed on one side than the other.  Some strategies and factors should include an explanation.</p> <p><b>Or</b>  Gives a detailed description of one side.  Some strategies and factors should include a detailed explanation.</p>	6

Question	Answer	Marks
9(c)	Level 1: 1–2 marks Gives a basic description of one or both sides. Strategies and factors include little or no explanation.  No response or no creditable response, 0.	

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