Paper 3 mark scheme

Question number	Indicative content	Mark
1	**AO1 (4 marks)** Award **1** mark for identifying a reason why tropical rainforests are a globally important physical system, and a further **3** marks for expansion up to a maximum of **4** marks. For example: • Key role in carbon sequestration (1) because, during photosynthesis, carbon from the atmosphere is converted into biomass (a carbon store) (1) which, in addition, means forests play a key role in climate regulation by balancing global CO_2 levels (1) and the 'lungs of the Earth' idea in terms of oxygen generation (1). • Key role in the water cycle (1), in terms of infiltration/interception and storing water rather than promoting surface runoff and flooding (1) copious evaporation/transpiration aids the production of clouds and maintains the equatorial climate (1) and the rainfall associated with the ITCZ climate belt (1). Reject arguments based on mineral wealth/other resources that involve the destruction of the forest. **Accept any other appropriate response.**	**(4)**

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2 (a)	**AO3 (4 marks)** Award 1 mark for completion of empty d and d^2 rows: 6 | 36 4 | 16 0 | 0 4 | 16 Award 1 mark for the sum of d^2 column (Σ) = 80 Award 1 mark for the correct working of equation: $1 - \frac{6 \times 80}{10^3 - 10}$ **or** $1 - \frac{480}{990} = R$ Award 1 mark for answers that round to R = 0.52 OR Award full marks for the correct value of R alone. Allow error carried forward from each step.	**(4)**

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2(b)	**AO3 (4 marks)** For each reason, award **1** mark for identifying a reason why the value for R which has been calculated may be unreliable, and a further mark for an appropriate expansion. For example: • The two sets of data are from different dates (1990–2005 versus 2014) (1), which means any relationship may be spurious/is questionable because the time periods do not correlate (1) because forest cover loss encompasses a 15-year period whereas income per capita is a snapshot of 2014 (1) and since 2004 rates of forests loss in some countries could have changed significantly either up or down (1). • The calculation is based on only 10 pairs of data (1) which is too small to be meaningful (1), especially as not all tropical forest countries are included (1) so the data is at best partial (1). • Forest loss data is likely to be a best guess in many cases (1), especially in LDCs with limited funds to monitor changes (1), and may be based on extrapolation from satellite data (1), which reduces its accuracy (1). Do not credit statements such as 'I may have incorrectly calculated the equation' or similar. **Accept any other appropriate response.**	**(4)**

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3	**AO1 (4 marks)/AO3 (4 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • development can be assessed using a range of measures, both human and economic but there can be issues of reliability with both single measures and indices to measure development • indices such as Gini Coefficient which is the most commonly used measure of a nations inequality may be used as they show more detail then single measures • economic development such as a higher income per person, can lead to further developments such as access to electricity • youthful populations are likely to have high birth rates and low economic development **AO3** • Angola's economy is growing much faster than the DRC/Congo; answers might argue this does not indicate level of development, only progress from a human development perspective, Angola looks weaker than Congo; it has a very high infant mortality rate (suggesting poor healthcare/access) and a low life expectancy – Congo is a full six years' more • credit the idea that, from Figure 5, Angola is almost wholly reliant on oil exports, which might suggest a very 'simple' economy • answers might refer to the Gini Co-efficient, which is very high for Angola, suggesting a very unequal society – perhaps meaning the per capita income data is of little value • a case can be made for Congo being the most developed; its per capita income is in the middle and the % living on less than $1.25 per day is the lowest of the three countries; income distribution is better than Angola and life expectancy, access to electricity and infant mortality are the best; its 43% population 0–14 might suggest it is transitioning towards a higher development level **Accept any other appropriate response.**

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	0	No rewardable material.
Level 1	1–3	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Investigates the question/issue to produce a limited analysis of data/evidence, making few connections to geographical ideas. (AO3)
Level 2	4–6	• Demonstrates geographical knowledge and understanding, which is mostly relevant but may include some inaccuracies. (AO1) • Critically investigates the question/issue to produce an analysis of data/evidence, making some logical connections to geographical ideas, which are mostly relevant. (AO3)
Level 3	7–8	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Critically investigates the question/issue to produce a coherent analysis of data/evidence, making logical connections to relevant geographical ideas. (AO3)

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4	**AO1 (4 marks) AO3 (4 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • as countries develop and industrialise into the secondary and tertiary sectors their reliance on natural resources drops; China, Botswana, Malaysia might be seen as evidence for this • there are exceptions where countries income per capita is high due to the relative value of the natural resources exported • some countries can be trapped in poverty regardless of what they export, because low-income countries cover a spread from 5% to almost 100% of GDP from the export of natural resources • some countries may have none, or very few, natural resources yet have a high income per capita and such as Argentina, Singapore or Japan **AO3** • overall, it is possible to see a weak negative, i.e. as fuel, mineral and ore exports drop, wealth per capita rises correlation, as there is a trend but the spread is wide and there are anomalies • there are a number of countries with income p.c. under $4000 and high exports (DRC, Nigeria, Mongolia, Cameroon) – however there are very low-income countries right down to 0% • Angola might be seen as anomalous as its % is almost 100% but its income p.c. is close to $6000 • all the countries with a p.c. GDP over $6000 have less than 50% mineral, ore and fuel exports and over $10000 the % is always below 30% • credit the idea that the data does not include food/crop exports, e.g. Costa Rican and Kenya coffee; it also shows only selected countries so is not a full picture. **Accept any other appropriate response.**

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Level 2	4–6	• Demonstrates geographical knowledge and understanding, which is mostly relevant but may include some inaccuracies. (AO1) • Critically investigates the question/issue to produce an analysis of data/evidence, making some logical connections to geographical ideas, which are mostly relevant. (AO3)
Level 3	7–8	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Critically investigates the question/issue to produce a coherent analysis of data/evidence, making logical connections to relevant geographical ideas. (AO3)

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5	**AO1 (3 marks)/AO2 (9 marks)/AO3 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • developing countries often rely on commodity exports, so their economies are not broad based and are likely to be vulnerable to price/trade volume changes • mineral resources have the potential to create wealth as they are in demand globally for energy and consumer electronics • developing countries have weak economies by global standards, lacking depth and breadth of connections (globalisation) which leads to weak consumer demand owing to low incomes **AO2** • a key advantage is that economic growth has been much higher than most countries and in the case of Angola similar to some of the BRIC such as China • another important economic advantage is that there are a variety of trading partners - both developed countries and emerging economies which reduces the risk of reliance on one trading partner • a trade surplus might be also be implied further creating economic advantages • the DRC has some variety of exports which reduces the risk of commodity dependence • the Congo and Angola do not have such a variety of exports and so might have economic disadvantages due to possible boom/bust in terms of export values, or difficult to manage fluctuations in revenues. There might also be issues of changes in terms of trade which would also negatively impact on the economies of the Congo and Angola • another key economic disadvantage is that the imports are mainly manufactured goods which will be relatively expensive due to 'trade trap' issues • food is also imported, which could be seen as creating dependency/suggesting a lack of self-sufficiency • the low levels of development are also a key economic disadvantage as issues like poor healthcare and low levels of education/skills indicate a weak workforce which might deter FDI • conflict might be a significant hindrance to economic development

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	although some TNC have a record of investing in unstable regimes **AO3** • economic growth is strong with rates varying between 4.4% and 10.3% • Figure 6 suggests China is a major trading partner, perhaps suggesting dependency/over-reliance on one trading partner • neo-colonial relations could be seen in Figure 6 as imports tend to come from ex-colonial powers, indicating an overall weak economic position • figure 8 shows that there are exports with variable value, and dependency on a limited range of exports; import profiles suggesting limited domestic manufacturing capability and therefore poor terms of trade overall • there is evidence of economic dependency in a number of sources: Angola is wholly dependent on oil (price crash risk) and highly dependent on China for exports • Figure 9 can be used to argue that commodity dependency is associated with low income economies, but not in all cases • DRC does export a range of commodities but cobalt prices have fallen, so have earnings; DRC looks more 'informal' as TNCs are much less involved and vulnerable to internal unrest • Figure 2 and inference from other resources can be used to make evidenced judgements about individual countries and/or the region as a whole. **Accept any other appropriate response.**

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Level 1	1–6	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical information/ideas, making limited and rarely logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2) • Makes superficial judgements about the value and reliability of quantitative and qualitative data/evidence. (AO3) • Investigates the question/issue to produce a limited interpretation of quantitative and qualitative data/evidence, but lacks meaningful connections to geographical ideas from across the course of study. (AO3)
Level 2	7–12	• Demonstrates geographical knowledge and understanding, which is mostly relevant but may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information/ideas to find some logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an argument that may be unbalanced or partially coherent. (AO2) • Makes some valid judgements about the value and reliability of quantitative and qualitative data/evidence. (AO3) • Investigates the question/issue to produce an interpretation of quantitative and qualitative data/evidence, making some meaningful connections to geographical ideas from across the course of study. (AO3)
Level 3	13–18	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2)

Level	Mark	Descriptor
		• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2) • Makes valid judgements about the value and reliability of quantitative and qualitative data/evidence throughout. (AO3) • Critically investigates the question/issue to produce a coherent interpretation of quantitative and qualitative data/evidence, making meaningful connections to relevant geographical ideas from across the course of study throughout the response. (AO3)

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6	**AO1 (4 marks)/AO2 (12 marks)/AO3 (8 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: There is no 'correct' answer here, although answers that argue 'more curse than blessing' are likely to be the most common; answers should present both sides and use evidence from the Resource Booklet to support their assertions. **AO1** • mining and other extraction industries support direct jobs as well as further employment opportunities through the multiplier effect and cumulative causation • jobs are low paid and exploitative, with poor/dangerous working conditions • some jobs are well paid and will lead to increases in income inequalities • there is a range of environmental issues linked to mining (water pollution, deforestation) **AO2** Possible argument for 'curse': • Colonial powers, who controlled the three countries' resources in the first half of the 20th century, are likely to have actively suppressed education for the poor/landless because an educated population might have threatened their control • There doesn't appear to be a strong relationship between proportion of GDP generated from exporting natural resources and the GDP per person, which suggests that being naturally rich in resources is not equivalent to a high standard of living • Many jobs in the oil industry might not go to local people but instead immigrants from the West/China therefore the money made from oil does not trickle down to local people • TNC profits from resource extraction are likely to be repatriated which leaves little for the three countries' governments in tax revenue that could support state welfare, which impacts the poorest disproportionately • There is often a link between conflict and mineral resources, with mining areas controlled by military groups in the DRC, or the oil and diamond industries being used to fund the Angolan civil war, which may disproportionately impact on the poorest people • Environmental costs are seldom included in any analysis so any short term economic gains are offset by longer-term environmental damage, for example the deforestation in the DRC. The need for conservation strategies has increased • An important cost to the environment is the destruction of habitats and pollution of local water bodies which not only reduces biodiversity but can also increase issues of water insecurity for local people. This could lead

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	to local conflict or even international conflict over the trans-boundary Congo River • All three countries are heavily reliant on China (both for imports and exports) making them dependent on China's status as a global economic power. This makes them vulnerable to any economic slowdown where China's buying power is reduced, reducing the three countries' revenue, and/or China's exports reduce, potentially derailing the three countries' economic development. Possible arguments for 'blessing': • There are direct and indirect jobs created in industries that have higher levels of pay than the subsistence agriculture that was likely to have been present in these countries before these resources were exploited • Access through tropical rainforest, swamps and water bodies to obtain the rich natural resources (particularly in Congo and the DRC) requires infrastructure that can act as a catalyst for development • Industrial development produces increased tax revenues (however small) that the governments of all three countries could use to improve infrastructure and services. Improved access to electricity (which is as low as 15% in the DRC) and healthcare to reduce infant mortality (which is as high as 102/1000 in Angola) would improve the chance that people living in these countries live beyond their 50s. • The situation may improve over time (Rostow model or Kuznet's curve) as it did in what are now developed countries. What could seem a curse, at this point in time for these countries, could be seen as the short-term drawbacks of a greater long-term benefit. • It may be that the resources are themselves a blessing, but it is their management that turns them into a curse. The rich resources would have played a large part in attracting the colonial powers to the countries in the first place. In the present day, all three countries still have important trade connections with their colonisers, and France still imports $0.9 billion of goods from the Congo. However these countries, particularly the DRC, have a history of poor governance post-independence with proceeds from the resource 'blessing' channelled into hands of a small elite; Over 70% of people in the DRC live on less than US$1.25 per day. • Resources may be more of a blessing if they are diversified. Countries, such as DRC, with a diversity of resource exports will be less sensitive to commodity price fluctuations than countries which rely on few resource exports, such as Congo and Angola, and therefore will gain a comparable advantage at these times. • Sometimes resources are more of a blessing than at other times, for example due to price fluctuations or the rise of new technologies such as smartphones and tablets. The production of lithium batteries in mobile phones and tablets relies on cobalt, which has had a stable price of US$35 to US$45. However, between 2005 and 2008 prices peaked at US$85, which would have been a short-term blessing for the DRC as the world's largest producer. Crude oil on the other hand, which Angola is reliant on, has fluctuated more with lows of US$20 to highs of US$115. Over time this can be considered more of a blessing for Angola because

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	prices have trended upwards. **AO3** • **Introduction to Section A**: all three countries were previously colonies, with the DRC and Congo gaining independence in 1960, and Angola experiencing a lengthy war to gain independence in 1975 and then experiencing civil war for almost 30 years until 2002, which indicates that there has been an unsettled political climate in the region • **Figure 9:** the countries with the highest GDP per capita have smaller proportions of their GDP coming from fossil fuels, mineral and ore exports - for example, Argentina has a GDP per capita of approximately $14,500 and about 9% GDP from exports, whereas Angola has approximately half the GDP per capita and 97% GDP from exports. • **Figure 12** includes opinion and views of external interest of groups such as American media and conservation charities, so their agendas should be taken into account • **Figure 12:** view 4 argues that resource rich countries benefit in terms of economic growth • **Figure 11** shows two extremes of resource development but there are likely to be a continuum of approaches that have varied impacts • **Figure 3, Figure 12** show that inequality is high in all countries; this might suggest the poorest simply never see any resource wealth (no trickle down); • **Figure 12:** issues of corruption are mentioned. View 1 makes this point. Poverty, child labour, exploitation are all serious issues; • **Figure 11** suggests mining is arduous and likely to be dangerous • **Figure 10 and 11:** resources show that deforestation is slow compared to other areas, but this may not last as significant areas of DRC have been licensed for artisanal and commercial logging ensuring future degradation • **Figure 11:** there are possible issues with soil erosion from mining and possibly oil spills off the coast of Angola/Congo • **Figure 10:** future deforestation and widespread degradation could result if localised mineral exploration in DRC turns into widespread exploitation • **Figure 10:** some large areas of DRC are protected

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Level 2	7-12	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2) • Makes some valid judgements about the value and reliability of quantitative and qualitative data/evidence. (AO3) • Investigates the question/issue to produce an interpretation of quantitative and qualitative data/evidence, making few connections to geographical ideas from across the course of study, which may not be meaningful. (AO3)

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Level 3	13-18	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2) • Makes mostly valid judgements about the value and reliability of quantitative and qualitative data/evidence. (AO3) • Critically investigates the question/issue to produce a coherent interpretation of quantitative and qualitative data/evidence, making connections to relevant geographical ideas from across the course of study, some of which are meaningful. (AO3)
Level 4	19-24	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2) • Makes valid judgements about the value and reliability of quantitative and qualitative data/evidence throughout. (AO3) • Critically investigates the question/issue to produce a coherent interpretation of quantitative and qualitative data/evidence, comprehensively making meaningful connections to relevant geographical ideas from across the course of study throughout the response. (AO3)