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MARK SCHEME

Maximum Mark: 100

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Question	Answer	Marks
1(a)(i)	Fig. 1 shows two storm hydrographs for a drainage basin. Identify the storm hydrograph for the drainage basin after urbanisation. A	1
1(a)(ii)	Identify <u>three</u> differences between the storm hydrographs. Hydrograph A has - shorter lag time - steeper rising limb - higher peak discharge - steeper recession limb - a shorter period of flood discharge 1 · 3	3
1(b)	Explain how <u>two</u> drainage basin characteristics influence the shape of storm hydrographs. The syllabus lists size, shape, drainage density, porosity and permeability of soils, rock type, slopes, vegetation type and land use. Temperature and/or precipitation could be included. 2 · 3	6

Question	Answer	Marks
2(a)	Fig. 2 shows trends in carbon dioxide concentration and average global temperature change for the period 1860 to 1990. Compare the trend in carbon dioxide concentration with the trend in average global temperature change shown in Fig. 2. Both show increase Temperature shows greater fluctuation Additional detail trend, i.e. most rapid increases after 1975 Only 3 marks if no data There needs to be direct comparison with data and years for full marks.	4
2(b)	Explain why there might be a relationship between average global temperature change and greenhouse gases such as carbon dioxide. Generic explanation as to how greenhouse gases lead to temperature change Detail about increases in carbon dioxide and other greenhouse gases Mark as 3/3, 4/2 or 2/4	6

Question	Answer	Marks
3(a)	Fig. 3 shows two different mass movements. Describe the main differences in the features of the landslide and the mudflow shown in Fig. 3. There are a number of features that could be mentioned: multiple rotational slumping for the landslide fluidity of mudflow with a flow track different shaped toe lobe slope angle differences landslide creates a scar 1 · 4 or 2 · 2	4
3(b)	Explain why mudflows occur. Explanation may include: fine clay particles and high water content added weight of water will lead to high shear stress reducing internal cohesion will lead to a reduction in strength of the materials discussion of slope angle in relation to mudflows influence of vegetation volcanic mudflows (lahars) are acceptable human activity such as by adding water to materials, e.g. Aberfan Mark on overall detail and quality.	6

Question	Answer	Marks
4(a)(i)	Table 1 shows total fertility rates for the world and for India, a country in South Asia, in 1970–74 and 2000–14 and predicted 2015–49. State the change in India's total fertility rate predicted in Table 1 between 1970–74 and 2015–19. 3 or 5.3 – 2.3	1
4(a)(ii)	In which 5-year period is India's total fertility rate predicted to be at replacement level? 2020–24	1
4(b)	Compare the trends in total fertility rates for India and the world between 2000–04 and 2045–49, using data from Table 1. Both TFRs show a decreasing trend. India's TFR is higher than the world's, initially, the greatest difference being in 2000–04 (India 3.1 and the world 2.7). In 2014 or 2015, there is a crossover point at TFR 2.4, after which India's TFR is slightly lower, e.g. 2045–49 India 1.9 and world 2.1 (predicted). For a comparison in words without data or for two separate descriptions without an element of comparison, maximum 2.	3
4(c)	Explain how increasing education for girls and women helps to lower fertility. Female education impacts TFR, lowering it in a number of ways, including: - empowering girls and women to make decisions about and changes to their lives - delaying marriage and reducing the fertile period by years spent in secondary and tertiary education - changing aspirations and goals, from family to career + family or to career (growing number of single women without children) - learning how to control their own fertility, e.g. through contraception - learning about the economic cost of having children and may choose to spend their income in other ways, e.g. lifestyle, travel - educated mothers want educated daughters and the trend continues - other Comprehensive explanations are not expected: a full answer could consist of two well developed points. Examples may be used but are not required.	5

Question	Answer	Marks
5(a)	Fig. 4 shows immigrants as a percentage of total population, by world region, in 1990, 2000 and 2010. Using Fig. 4, name the world region which had no change in percentage immigrant population between 2000 and 2010. Latin America and the Caribbean	1
5(b)	Describe the pattern of percentage immigrant population by world region in 2010, supporting your response with evidence from Fig. 4. The six world regions fall into two groups. Africa, Asia and Latin America and the Caribbean have <2% immigrant population in 2010. Europe, North America and Oceania, the second group, have substantially higher immigrant populations, 9–16%. (Or credit Europe as a middle value of approx. 9%, as the question is about pattern, with North America 14% and Oceania 16%). MEDC/ LEDC labels could be used with care to help describe pattern, but the make-up of several world regions is mixed, e.g. Asia and Oceania. For a clear description of pattern, without data support, maximum 2. Note that the question specifies pattern in 2010 and not changes over time.	3
5(c)	Explain some of the <u>push</u> factors which cause international migration. Push factors are those operative in the home country which encourage or force international migration (emigration), these comprise: - economic factors, e.g. unemployment, personal debt, economic crisis - social factors, e.g. ambition, ability, stage in life cycle, personal crisis, lack of services - environmental factors, e.g. climate change, loss of land, low physical quality of life, hazardous events such as earthquake - political factors, e.g. instability, conflict, intimidation, poor governance A full response comprises three detailed and developed factors or a more broadly based explanation of push factors. If simply a list with no explanation, maximum 3.	6

Question	Answer	Marks
6(a)	Fig. 5 shows the plan of Fulaishan Economic and Technical Development Zone (ETDZ), China. Name the land-use along Fuhai Road inside the urban boundary shown in Fig. 5. green belt	1
6(b)	Give <u>three</u> pieces of evidence from Fig. 5 which show that Fulaishan is a planned urban area. Several features may be identified as evidence, including: - neat, almost symmetrical shape within designated urban boundary - long term development boundary set - design of road layout, grid pattern and arteries to enable traffic flow - zoning of land-uses (functional zonation), e.g. commercial/residential zone to the west, industrial zone to the east - integration of green belt land within urban area - open space fringe to the north bordering the Yellow Sea and to the east bordering the River Jia - other Do not accept for credit the word 'Plan' from the title of the map. Credit each piece of evidence from Fig. 5 with a clear link to urban planning 1 mark	3
6(c)	Explain some of the possible consequences of urban growth for surrounding rural settlements. The content of Fig. 5 may be used as a stimulus, but reference to it is not required in this more open part-question. Possible consequences may be seen as positive and negative, advantages and disadvantages and immediate, long term, etc. Consequences may include: - loss of agricultural land for food production, both subsistence and sale - villagers make money from sale or compulsory purchase of land - villages become part of urban area, 'swallowed' by its expansion - loss of village heritage, tradition, culture and identity - inflation of costs of village housing, more affordable to newcomers than traditional residents - villagers may 'cash in' by selling up and relocating - better access to services, e.g. shops, transport, education, health - environmental degradation, e.g. removal of trees, pollution, noise - jobs available in urban area, commuting pattern established - modernisation of rural life and lifestyle - other A full response comprises three detailed and developed consequences, or a more broadly based explanation of consequences. For a wholly positive or negative view, maximum 5.	6

Question	Answer	Marks
7(a)(i)	Define the fluvial terms <i>solution</i> and <i>traction</i>. Solution – water acting as a solvent (dissolving) (1 mark), most effective when acidulated such as carbonation / limestone (1 mark), or transported in the river as a solute load (1 mark). Traction – the transport of large material (1 mark) by rolling or sliding along the channel bed (1 mark). Mark as 2 + 2	4
7(a)(ii)	Briefly describe the features of a braided river channel. The command is briefly and there are only 3 marks available. The features that could be mentioned are multiple channels, sand bars and vegetated islands (eyots), relatively coarse material and perhaps the steepness of the river channel. Variable discharge.	3
7(b)	Describe and explain the formation of riffles and pools in the development of a meandering river channel. There are two commands here but do not expect equal coverage. The description will probably be better than the explanation, especially with respect to the formation of riffles. The best answers will relate the spacing of pools and riffles to the width of the channel (riffles occur at about 6 times the channel width). The inequalities in bed roughness lead to the development of a sinuous channel with erosion gradually increasing the sinuosity and bank undercutting due to the direction of the thalweg creating the pools on the outside of the bends. Some may discuss helicoidal flow as a secondary flow across the channel which may increase sinuosity.	8

Question	Answer	Marks
7(c)	To what extent do climatic factors influence the annual hydrographs of rivers? Annual hydrographs relate to flow patterns over the year. Climate will be seen as the main influence with seasonal variations in precipitation amounts and nature, including snow and glacier melt. However, there are other significant factors and discussion of these should form the basis of the assessment. Other factors include the nature of the vegetation with respect to evapotranspiration and how this varies with the season of the year. The crop growing season will also affect the flow of water to the rivers as well as water abstraction at different times of the year for irrigation, etc. Level 3 8–10 Response addresses the question fully and is well focused with a well structured response that discusses fully the nature of annual hydrographs and evaluates the factors that affect such hydrographs. The material is integrated effectively into a response developed on a secure basis of detailed knowledge and conceptual understanding. Level 2 5–7 Response is partial in addressing the question and focus is not maintained. Some relevant knowledge of the factors affecting annual hydrographs is shown but with limited assessment. Understanding of the topic is partial and may be inaccurate. Level 1 1–4 Response comprises a few points which address the question simply or in part. Knowledge is basic in an entirely descriptive response that focuses on a limited number of factors affecting annual hydrographs. Expression is unclear. No response, or no creditable response 0	10

Question	Answer	Marks
8(a)(i)	Describe <u>two</u> components of the daytime energy budget. There are six components to choose from: incoming short wave solar radiation (insolation), outgoing long wave terrestrial radiation, latent heat transfer, sensible heat transfer, reflected solar radiation, absorption (conduction) by the surface. Mark 2 + 2	4
8(a)(ii)	Explain how dew is formed. A standard explanation with the rapid cooling (1 mark) of a surface at night as a result of radiation or advection (1 mark) which reduces the temperature to the point where condensation occurs (1 mark).	3

Question	Answer	Marks
8(b)	Explain how environmental and adiabatic lapse rates influence weather. The focus should be on the relationships between the cooling rates and whether this leads to the rising of air to condensation level and its continued rise to produce clouds and perhaps precipitation. Stability will be the converse of this, leading to calm weather conditions. Better answers may include conditional instability.	8
8(c)	Assess the extent to which latitude influences global temperature patterns. There needs to be a discussion of the role of latitude in influencing global temperature patterns, including seasonal variations. Other relevant factors could include: - altitude - ocean currents - the distribution of land and sea - prevailing winds Level 3 8–10 Response addresses the question fully and is well focused with a well structured response that discusses fully global temperature patterns and evaluates the role of latitude, ocean currents and other factors in explaining these patterns. The material is integrated effectively into a response developed on a secure basis of detailed knowledge and conceptual understanding. Level 2 5–7 Response is partial in addressing the question and focus is not maintained. Some relevant knowledge of the distribution of global temperature patterns is shown but with limited assessment of the role of latitude, ocean currents and other factors in explaining these patterns. Understanding of the topic is partial and may be inaccurate. Level 1 1–4 Response comprises a few points which address the question simply or in part. Knowledge is basic in an entirely descriptive response that shows limited knowledge and understanding of the topic. Expression is unclear. No response, or no creditable response 0	10

Question	Answer	Marks
9(a)(i)	Define the terms <i>oxidation</i> and <i>solution</i>. Oxidation – the addition of oxygen (1 mark) to a material such as the change from ferrous to ferric iron oxide (1 mark). Solution – water acting as a solvent (dissolving) (1 mark), most effective when acidulated such as carbonation / limestone (1 mark).	4
9(a)(ii)	Briefly explain how organic action may lead to the weathering of rocks. The chemical processes are dominated by the role of humic acids and chelation. Physical (mechanical) processes include the growth of vegetation roots in rock cracks and burrowing of animals.	3
9(b)	With the aid of a diagram, describe and explain the processes and landforms associated with sea floor spreading. There should be recognition that sea floor spreading occurs at divergent oceanic plates driven by convection currents. This leads to the upwelling of basaltic magma which solidifies to produce underwater ridges and volcanoes. Better answers might note that spreading rates are not the same throughout the mid-ocean ridge system, but vary from a few millimetres per year in the Gulf of Aden to 6 centimetres a year for the East Pacific Rise. Slow spreading sites, such as the Mid-Atlantic Ridge have a pronounced rift down the centre, while fast spreading sites lack the central rift and have a smooth topography. Lateral movement may also produce transform faults. Maximum 5 if no diagram	8

Question	Answer	Marks
9(c)	To what extent do human activities affect slopes? This is a very broad question and should provide scope for a variety of points to be discussed. The emphasis will probably be on the effects of human activity on the stability/instability of slopes but there is also scope for a discussion of the form of slopes. Human activities affecting slopes could include: - deforestation/afforestation - quarrying/mining - construction/heavy traffic - building on steep slopes - agriculture Factors other than human activity could include: - rock structure - soils - climate - vegetation - relief (steep slopes) - natural events such as earthquakes, volcanoes, undercutting by rivers Level 3 8–10 Response addresses the question fully and is well focused with a well structured response that discusses fully the extent to which human activities affect the nature of slopes. The material is integrated effectively into a response developed on a secure basis of detailed knowledge and conceptual understanding. Level 2 5–7 Response is partial in addressing the question and focus is not maintained. Some relevant knowledge of the many ways in which human activities might affect the nature of slopes is shown but with limited evaluation. Understanding of the topic is partial and may be inaccurate. Level 1 1–4 Response comprises a few points which address the question simply or in part. Knowledge is basic in an entirely descriptive response that shows limited knowledge and understanding of the topic. Expression is unclear. No response, or no creditable response 0	10

Question	Answer	Marks
10(a)	Give the meaning of the term <i>natural increase</i> and explain how a natural increase rate is calculated. Natural increase is the change in population/number of people <u>without</u> the influence of migration (gains and losses). It may be positive or negative – a negative rate of natural increase is sometimes referred to as ‘natural decrease’. Formula: birth rate - death rate = natural increase rate per thousand or percentage e.g. $22 - 9 = 13$ per thousand or 1.3% Credit details as to how birth rate and death rate are calculated 3/4, 4/3	7
10(b)	Explain why it can be difficult to reduce the birth rate in LEDCs. This can be difficult for a number of reasons or factors, often working in combination: - social, e.g. tradition, cultural norms, religious basis of society, illiteracy, takes time to change attitudes - economic, e.g. use of child labour, children caring for elderly parents, family poverty, cost of contraception - physical, e.g. inaccessibility of remote areas - political, e.g. instability, conflict, poor governance, other political priorities, idea of ‘a strong nation’ Mark holistically. A full response may comprise four developed points with some exemplar support or a more broadly based explanation.	8

Question	Answer	Marks
10(c)	Assess the usefulness of the demographic transition model (DTM) for understanding population change. A diagram is not required but would be very helpful. The syllabus specifies ‘a critical appreciation of the demographic transition model’. Criticised for being Eurocentric (being based on the historical experience of a few European countries) and unreal (no countries in Stage 1, the need for the addition of a Stage 5), it retains some value. It is, however, descriptive of change rather than explanatory. Possible usefulness comes from the visual representation of changes in birth rate and death rate, and thus natural increase rate, over time and from indicating what happens next in population transition. It may be seen as least useful where change is rapid and Stages 2 and 3 occur almost simultaneously; in countries where strong government policies impact birth rates, or where it does not fit a country’s statistics and path. Level 3 8–10 Response provides an effective and conceptually strong assessment of the DTM’s usefulness and limitations for understanding population change. It integrates detailed exemplar material. Level 2 5–7 Response makes a reasonable attempt to analyse the DTM’s usefulness, which remains partially developed or unbalanced. Assessment is limited or brief. Some use of examples is made. Level 1 1–4 Response comprises a few basic ideas about population change which may be general. It makes little or no assessment, describing the model or reproducing material about population without a link to the DTM. Fragments and notes remain in this level. No response, or no creditable response 0	10

Question	Answer	Marks
11(a)(i)	Define the term <i>population structure</i>. Population structure is the make-up of a population, at any scale, comprising its component groups. The key elements are age, gender and dependency (young, economically active and aged groups).	3
11(a)(ii)	Draw a labelled diagram to show the effects of outmigration on the population structure of a rural area in an LEDC. The classic diagram to draw is an age/sex pyramid. Whatever the shape of the population structure, expect to see concavity or ‘missing groups’ in the economically active age group for males, and, probably to a lesser extent, for females. Disproportionate size of young group (15 years and under) and aged group (65 years and older). The diagram should show x axis labelled population (either percentage or numbers), males to the left and females to the right; with age in years or age groups on the y axis, either on the central spine or to one side.	4
11(b)	Explain why urban-rural migration occurs in MEDCs. A number of reasons may be covered, including: - counterurbanisation, when urban residents ‘escape’ the negative externalities of urban life, e.g. congestion, pollution, and gain the positive externalities of rural life, e.g. a greener, more peaceful existence (with commuting or homeworking) - retirement migration, when people are no longer working so do not need to live near to their jobs - other reasons, e.g. when raising children, a move for larger gardens, better schools, etc.; change in jobs Mark on overall quality. A full explanation consists of at least two circumstances with exemplar detail. For one circumstance explained well, maximum 5 marks.	8

Question	Answer	Marks
11(c)	Evaluate the role of information in making the decision to migrate. Hard, factual information takes a varied role in deciding whether to migrate or not and where to go. For example, in forced (involuntary) migration it may be of little significance as there is no choice involved, for example, in an emergency evacuation or in government relocation. Where individuals consider migrating, information may be difficult to obtain, inaccurate or biased. The role of perception is pertinent as are the characteristics of the individual(s), e.g. how organised they are or their risk-taking traits. Candidates are likely to consider information within a complex and dynamic web of push factors, pull factors and facilitating factors such as finance and transport. The different sources of information, e.g. published, media, friends may be pertinent. Level 3 8–10 Response develops a perceptive evaluation of the role of information and other factors in migration decision-making, with strong understanding of migration as the context and the integration of detailed exemplar support. Level 2 5–7 Response gives a satisfactory but limited explanation of migration decision-making with some use of example(s). Evaluation is present, but partial or limited, with an insecure focus on information. Level 1 1–4 Response comprises a few basic points about migration and migration decision-making. It provides a description and/or an explanation rather than an evaluation, or a simple unsupported opinion. Notes and fragments remain in this level. No response, or no creditable response 0	10

Question	Answer	Marks
12(a)	With reference to one or more named shanty towns (squatter settlements) in an LEDC: explain the difficulties experienced by the people who live there; Any difficulties may be described, for example: social, e.g. overcrowding, conflict, lack of schools and doctors, gangs economic, e.g. unemployment, informal jobs, personal debt, poverty environmental, e.g. pollution, poor sanitation, unsafe water supply political, e.g. lack of representation, lawlessness, low urban priority The command 'explain' means that an explanation of why it is difficult for the residents is needed, rather than simply a description of what is difficult. Mark on overall quality. A full response consists of at least two difficulties explained and supported from the chosen context. For one difficulty, maximum 4 marks. Generic answer only, maximum 3 marks.	7
12(b)	With reference to one or more named shanty towns (squatter settlements) in an LEDC: describe the attempt(s) made to improve living conditions; This may include attempts by national government, city authorities, NGOs and the residents. What has been done may include improvements in: housing, e.g. permanent structures, materials, number of units basic services, e.g. piped water supply, sanitation, safe electricity supply, waste removal social services, e.g. schools, clinics, access to doctors transport, e.g. surfaced roads, bus services provision of paid employment Any other initiatives, such as empowerment, self-help, advocacy, which would contribute to improving living conditions. Mark on overall quality looking for exemplar detail of what was done, where, when, by whom, etc. A full response could consist of one major attempt or two or more smaller attempts in the chosen shanty town(s). Generic answer only, maximum 3 marks.	8

Question	Answer	Marks
12(c)	With reference to one or more named shanty towns (squatter settlements) in an LEDC: evaluate the success of the attempt(s) you described in (b). The direction of the response depends on the case study. Success may be considered in relation to different success criteria, the most important of which is whether living conditions improved. It may be pertinent to consider scale of success, different stakeholder groups, timescale, etc. There may have been associated problems or unforeseen outcomes. Level 3 8–10 Response makes an effective and conceptually strong evaluation of the success of the attempt(s), identifying relative success/failure by attempt, location or stakeholders. Integrates detailed exemplar material. Level 2 5–7 Response makes a reasonable attempt to analyse the success of the attempt(s), which remains partially developed. Some use is made of case study detail. Evaluation is limited or brief. Level 1 1–4 Response comprises a few basic points about attempts to improve shanty town(s), which may be quite general. It offers little or no evaluation, such as an unsupported statement of success (or failure). Fragments and notes remain in this level. No response, or no creditable response 0	10