Geography   **6890/02**

Paper 2 Geographical skills   October/November 2018

Mark Scheme   **2hours 15 minutes**

Confidential

MARK SCHEME

{6890/02}

MARKS: 90

This document consists of **17** printed pages.

SECTION A

ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED

1. Study the map extract of Shamva, Zimbabwe on the scale 1: 50 000

   Fig. 1 shows the position of some feature in part of the map extract. Study the map extract in Fig. 1 answer the questions which follow.
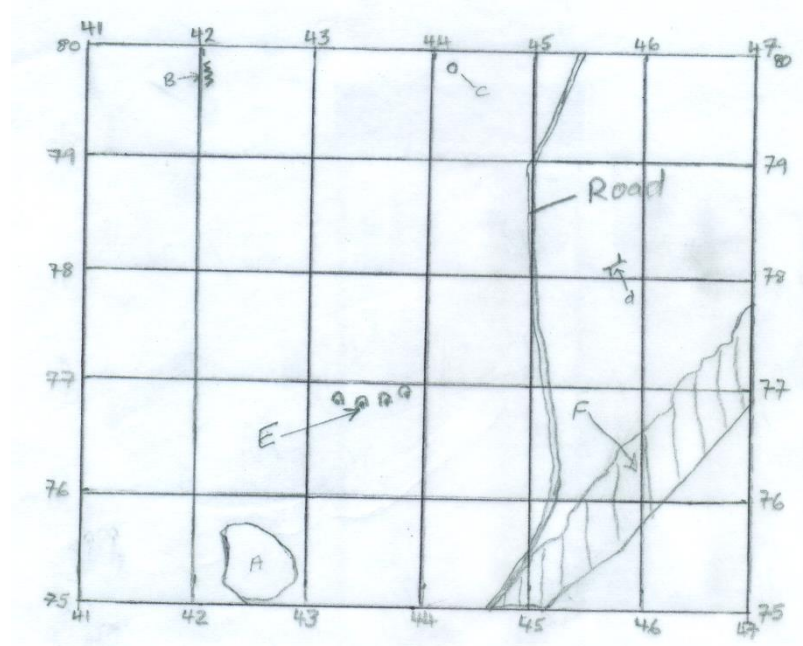

Fig. 1

(a) Name the following features shown on Fig. 1:
   (i)   Natural feature A (4275);

   A - Smooth rock   [1]

   (ii)   The economic activity shown at B (4279);

   Mining   [1]

   (iii)   Man-made feature at C (4479);

   Reservoir   [1]

   (iv)   Feature D (4578);

   Dip tank   [1]

   (v)   Man-made structures at E (41

   Huts   [1]

(b) Describe the gradient in the area marked F on Fig. 1.

Steep slopes/Scarp slope   [1]

(c) (i) What is the highest altitude on mount Masimbe near the south of the map extract.

1573.2m   [1]

(ii) Give the six- figure grid reference of this highest altitude.

470735/ 469734   [1]

(d) Measure the distance in kilometres along the railway line from Shamva station to the bridge over Pote River.

7 - 7.2 Km

(e) In which general direction is the Mazowe River flowing?

East   [1]

(f) State **two** agricultural activities along Mazowe River.

1. **Cultivation**

2. **Orchard**

3. **Irrigation / watering animals**   [2]

(g) Give **four** services provided in the community of Shamva.
(Allow the name of the symbol e.g. Post office)

1. **Posting / Post office**
2. **Safety and security**
3. **Health/medical**
4. **Administrative**
5. **Recreation e.g. sportfield, rifle range**   [4]

(h) Give **two** reasons why many rural settlements are found on the south-eastern part of the map extract.

1. **Gentle slope**
2. **Water supply**
3. **Arable land**
4. **Cultivation**   [2]

(i) Identify the river drainage patterns shown on Tsamvi Hill (4884) and on the eastern slopes of Masimbe mountain.

Tsamvi -**radial**

Masimbe -**dendritic**   [2]

[Total: 20marks]

2. (a) Study fig. 1 which shows a simple fold.

    (i)   Define folding

              Crumpling / bending / warping of the earth's crust   [1]

    (ii)   Name the type of force labelled X.

              Compressional force   [1]

    (iii)   Identify the features labelled A and B.

              A **Anticline / crest / upfold**

              B **Sycline / downfold/ trough**   [2]

(b) Study fig. 2 which shows the distribution of the world's fold mountains.

(i) Describe the distribution of fold mountains.

    West of USA / North America

    Western south America

    Atlas mountain – north Africa

    Himalayas – north India

    Southern Europe – Alps

    East Asia

    East Endies   [2]

(ii) State two effects of fold mountains on local people

**Barrier to communication
relief rainfall (windward side)
lack of rainfall (leeward side)
mountainous relief – hampers arable farming
catchment area
tourism**

[8 Marks]

3. (a) Photograph 1 (insert) shows a form of power generation.

(i) Name the source of energy used in fig. 3

Wind [1]

(ii) Identify parts of this instrument.

A **Rotor / blades**

B **Tower**

(b) Using Photograph A, describe two factors which favour the location of this type of power station.

Open area

Gentle sloping

Short grass [2]

(c) Suggest 3 disadvantages of generating power as shown in photograph 1.

Noise pollution

Visual pollution

Expensive to set up

Threat to flying animals / birds [3]

4. (a) Photograph B (insert) shows a type of farming.

(i) Name the type of farming shown on photograph B.

Pastoral farming [1]

(ii)   List two outputs from the type of farming shown on photograph B.

Hides
Meat
Milk [2]

(b)   Describe two ways in which this type of farming can be improved for better quality of the outputs.

Fencing

Rotational grazing

Reduction in numbers / destocking [2]

(c)   Suggest three negative impact of this type of farming on the environment.

Overgrazing

Soil erosion

Methane production / global warming [3]

[8 marks]

5. (a) Fig.5 shows a demographic transition model .

(i) Name the line labelled X.

Total population [1]

(ii) In which stage is there a natural decrease in the population.

Stage 1 [1]

(iii) Describe three changes shown in stage 3.

Drastic fall / decline in birth rates
A low but slight fall in death rate
Fastest rate of natural increase [3]

(b) Suggest three reasons for decrease of death rate in stage 2.

Improvements in diet / nutrition / food supplies

Improvement in medical care

Improved standard of living

Fall in infant mortality

Improvement in sanitation / level of hygiene

Improvement in quality of water supplies. [3]

6. (a) Table 1 shows mean monthly temperatures and rainfall for an area in a tropical

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
^{0}C	14	14	15	16	17	20	22	21	16	17	15	14
mm	10	15	19	20	22	30	30	29	09	04	02	10

Table 1

(i) In which hemisphere is this area found?

Southern hemisphere [1]

(ii) Using the information on table 2 calculate the annual temperature range.

8^{0}C [1]

(iii) Use the information in table 2 to complete fig. 5 by adding temperature and Rainfall for March.

Correct on the graph [2]

(b) Suggest why June and July are warmer than November and December.

Temperature rises [1]

(c) Suggest the type of vegetation associated with this climatic region.

Scattered trees

Cactus

Thorny bushes

Tufted grasses [9]

[8 marks]

SECTION B

CHOOSE EITHER QUESTION 7 OR QUESTION 8.

7 Some students were studying the characteristics of a river and how they change downstream. They wanted to investigate possible reasons for changes in velocity (speed of flow) across a meander in the Great Usuthu River. Before setting out for

The investigation the teacher suggested that they should first carry out the Investigation in a local stream next to the school.

(a) (i) Suggest three pieces of advice the teacher could give the students.

- **Avoid deeper ends/ fast flowing**
- **Check condition if river is in flood**
- **Look out for dangerous animals**
- **Avoid drinking/ water may be polluted**
- **Some rocks may be slippery**
- **Work in groups or pairs** [3]

(ii) In preparation the teacher with a group of five students visited a local stream to To do a pilot survey. Give three advantages of doing a pilot study.

- **To check suitability of the investigation**
- **To check if site was appropriate**
- **To minimise surprises**
- **To check if instruments are appropriate** [3]

(b) The students decided to investigate two hypothesis about the speed of Flow (velocity) of the water in the river.

Hypothesis 1: *The surface velocity across a river meander varies*
Hypothesis 2: *Velocity is greater on the surface and decreases as the depth of the channel increases.*

To investigate hypothesis 1 the students made some measurements on the meander.

(i) Describe how the students measured velocity using cork, a tape measure and a stop watch.

- **Measure section along rive[**
- **Time floats over measured section using the stopwatch**
- **Repeat timing exercise at points/ more than once**
- **Calculate surface velocity = distance** [3]
                                          Time taken

(ii) The students measured the depth of the river at four sample points across the meander. How did they measure the depth, refer to equipment they would have used.

- **Rest ruler on river bed/ ranging pole**
- **Ensure ruler is upright/vertical**
- **Take reading of water surface on ruler**
- **Measure part of stick which is wet** [3]

(iii) The results of their measurements are shown in table 7. Fig. 8 is a sketch of the meander.

Table 7

Sample Point	Surface Velocity (cm per second)	Depth of Channel (metres)
A	20	0.35
B	40	0.60
C	60	0.75
D	73	0.90

A sketch of a river meander to show sample points.

What conclusion would the students have made about **hypothesis 1**:*"the surfacevelocity across a river meander varies"?* Use evidence from table 7 to suggest how they reach their conclusion.

- **Hypotheses correct**
- **Velocity is greater near outer bank of meander, sample point D**
- **Velocity decreases towards the inner bank, sample point A**
- **Velocity varies across river surface**
- **Velocity is greater where river is deeper/ least where river is shallow**
- **Use figures from A to D or vice versa**

(c) When the students discussed how they carried out their investigation one student pointed out some limitations/weaknesses to the method used.

(i) Give three problems of using a cork in measuring velocity.

- **Only measures surface velocity**
- **Could get stuck on vegetation**
- **Strong winds may interfere with movement**
- **Float route may be unpredictable**
- **Float may move into main current**
- **Need to do more trials**
- **Random positioning of sample points/ unequal distances apart** [3]

(ii) The teacher agreed with the students on the problems of using a cork and suggested they use another meander of the same river to improve their investigation. First they used a flow meter to measure the velocity this is shown on photograph A and fig. 8 insert. Suggest how they used this equipment.

- **Put flow meter on the bed of river/ into river**
- **Must be held vertically**
- **Stand downstream**
- **Propeller must face upstream**
- **Propeller spins/ rotates**
- **Must record digital readings/ metre shows velocity**
- **Take several readings to calculate average**   [3]

(iii) Using their results obtained using the flow meter the students plotted velocity more accurately. The results are shown in Fig. 9 below.

Sketch of the meander to show velocity at different points

On fig. 9 shade in the part of the river where the current is greater than 60 cm/second.

Correct shading where current is greater than 60 cm/sec   [1]

(d) (i) Use the information on fig. 9 to decide whether you agree with **hypothesis 2:**
"*Velocity is greater on surface and decreases as the depth of the channel increases.*
Use evidence from figures given in fig. 9 to support your conclusion.

- **True/ correct/ agree/ partly agree**
- **Supporting data: two current measurements: 40-37; 19 cm/sec**
- **But where current is strong, there is exception/ hypothesis does not apply everywhere across meander**
- **Greatest velocity 1/3 of depth under water surface**
- **Velocity decreases below 1/3 depth**   [3]
  NB: Allow two marks for comparative figures

(ii) Explain the variation in velocity on the meander as shown in Fig. 9.

- **Surface velocity is affected by friction with atmosphere**
- **Velocity near bed/ banks of channel reduced by friction with the channel**
- **Greatest velocity is where current is strongest/ river is deeper has most energy**   [2]

(e) To extend their investigation the teacher decided they compare their results from the meander with a straight stretch of the river 70m further down. A cross-section of the straight stretch part of the river is shown below.

Fig.

(i) On fig. 10 complete the 60 per second isoline.
Completion of 60 cm/sec isoline [1]

(ii) Suggest what similarities and differences would the students find between the velocity in the two sections of the river.

Similarities:

- **Greater velocity slightly beneath surface/ at surface**
- **Greater velocity where river is deeper**
- **Velocity decreases near banks/ bed** [2]

Differencies:

- **Velocity faster in middle of channel on straight section**
- **Velocity decreases more evenly towards bed/ banks on straight section**
- **Meander asymmetrical shape/ straight section symmetrical** [2]

[Total: 30 marks]

8 Students wanted to investigate some characteristics of the Central Business District (CBD) of a city in an LEDC,both in terms of pedestrian and vehicle traffic. Fig. 9 (Insert)shows the centre of the town. Students decided to map pedestrian flows and interview shoppers in order to test the following hypothesis.

Hypothesis 1: *traffic flow patterns vary during the day.*

Hypothesis 2:*the number of pedestrians decreases away from the central point of the CBD.*The students chose 8 sites to do the traffic survey, these are shown on Fig 9 (Insert). They agreed to do 4 separate counts each lasting one hour at the following times:

- 0800 – 0900
- 1100 – 1200
- 1400 – 1500
- 1700 – 1800

(a) (i) Describe how the students would organise a traffic survey. Refer to their planning and recording.

- One student on each side of the road
- count traffic on their side passing them in and out of town
- synchronise timing
- tally method of recording
- add up totals
- equipment used (recording sheet , pencil, eraser) [2]

(ii) Suggest three difficulties which the students might have had when doing the survey.

- **starting counts at the same time**
- **excessive traffic to record at the same time**
- **adverse weather conditions.** [3]

(b) The results of the students traffic survey at site 3 are shown in Table 3 below:

Table 3

Time Survey	Motor bikes	Cars / vans	Mini buses	Lorries / buses	Total Vehicles
0800 – 0900	8	102	40	15	**165**
1100 – 1200	6	108	27	17	158
1400 – 1500	4	70	30	20	124
1700 -1800	2	41	20	10	73

(i) Complete Table 3 by calculating the total number of vehicles counted between 0800 – 0900 hrs.
165 [1]

(ii) The students converted their vehicle counts into percentages. What percentage of the total number of vehicles between 1400- 1500hrs were minibuses.

$$\frac{30}{124} \text{ x } 100\%$$

$$= 24.25$$

(iii) Use the data in Table 3 to complete the divided bar graph on Fig. 10 for the traffic survey results between 1400 and 1500hrs.

Correct plotting on graph paper   **res 1**

Correct key   **res1**   [2]

Fig. 10

(iv) Which other type of graph would be suitable to show traffic survey results between

1100 – 1200?

- **pie chart/ pictogram**   [1]

(v) What conclusion would the students at site 3 make about **Hypothesis 1** *Traffic flow patterns vary during the day?* Support your decision with evidence from Table 3 and Fig.10.

Survey Time	Total Vehicles (All Types)
0800 – 0900	165
1100 – 1200	158
1400 – 1500	124
1200 – 1800	73

- **Hypothesis correct**

- **Traffic flow on site 3 for all types of vehicles vary in terms of figures**   [4]

(vi) Suggest a reason for a high volume of minibuses between 1700 – 1800hrs.

Commuters from work returning back to their places of residence

(c) The students then investigated **Hypothesis** *2: The number of pedestrians decreases away from the central point of the CBD.*

(i) (The point marked X on Fig. 9 (Insert) was identified as the central point of the CBD from which the students made their measurements. Give **three** characteristics which the students may have used to decide on the central point of the CBD.

- 1 **tall buildings**
- 2 **high vehicular traffic**
- 3 **functions and offices/ shops**

[3]

(ii) The students wanted to make their field work as accurate as possible so they measured distances 200m, 400m and 600m away from the central point along the roads in each direction, the survey sites are shown in Fig. 9 (Insert). At each site they did a pedestrian count lasting ten minutes at four different times during the day. A copy of the recording sheets used by the students is shown in Fig. 12 below. Complete the recording sheet by inserting the correct total.

RECORDING SHEET

Street Name: Gwamile

Distance from Central point: *200m*

Time of Survey: *0800 – 0810*

Tally of Survey: Total:

Fig. 12

Correct total 17 pedestrians

(iii) Sampling points were chosen at 200m, 400m, and 600m away from the central point. Name this sampling method

Systematic   [1]

(iv) State **one** advantage
Advantage:

- **Quicker/ easier**
- **Without bias**
- **Ensures good coverage of population**
- **Prevents clusters from being selected** [1]

(d) Study the results of three survey sites on Gwamile street which are shown on Table 4.

Table 4

Distance from central point (m)	0750 - 0800	1000 - 1010	1300 - 1310	1700 -1710
200	75	50	50	20
400	30	20	15	10
600	12	07	06	03

The results of the pedestrian counts are mapped with isolines in Fig. 13 below.

Fig. 13

(i) On Fig. 8 draw an isoline for the value of 55 pedestrians. [1]

Correct drawing of the 55 pedestrian isoline

(ii) Use the key provided in Fig. 13 to shade in the area where more than 70 pedestrians were recorded. [1]

Correct plotting on graph

(iii) To what extent does the information on Fig. 13 support **Hypothesis 2** *the number of pedestrians decreases away from the central point of the CBD.*

- **Hypothesis correct**
- **Isoline graph shows a decrease from X in all directions along roads outwards**
- **Commuting to work in the town centre**
- **School run traffic**
- **Returning home at the end of the working day**
- **Other peak in the middle of day**

(iv) Suggest **two** how the investigation could be improved.

- **Use of more sites / increase the number of sites along a street.**
- **Use different times of the day**
- **More days / increase the number of days**
- **Two students per each sites/ students in pairs / pairing** [4]

[Total: 30 marks]