

## PHYSICAL SCIENCE

Here are the answers to the questions on the Physical Science given to you in the W, previous issue.

### Question I

1.1 B 1.2 C 1.3 E' 1.4 E

1.5 B 1.6 D 1.7 D 1.8 E

1.9 D 1.10 D

### Question? '

2.1 (a) (2 km 2 10 mm

. 13 km 2 65 mm

18 km 2 90 mm)

1: R 65mm (1am) '

30mm 18km) . -

R: 25mm

Resultant : 5km , direction 270'

(b) (2 km 2 10 mm

t: 12km 2 60mm

15km 2 75 mm)

75mm (1skm)

R: 104-mm

'. Resultant: 20.51am ,dirwon 7e:

60mm(60m)

RIVEF5IDE

100m (100m)

, yszmwrz op MAN

(10 m 2 10 mm

t 100 m 2 100 mm

60 m 2 60 mm)

R 2 116 mm

.. Resultant 2 116 m,

590 with riverside

2.3

(50m 2 10 mm

200 m 2 40 mm

500 m 2 100 mm

.. 400 m 2 80 mm

200 m 2 40 mm)

R 2 47 mm

Position relative to starting point is

235 m, direction 255,.

Student's enquiries to: Learning

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Springfield 2137.

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Street Extension, Johannesburg.

loommmwoam)

40mm (159m)

30mm (400M)

:Ezao' .

Total

24

### Question 3

3.1 A scalar quantity has magnitude only, e.g. distance. A vector quantity has magnitude and direction, e.g. displacement (or force).

3.2 Two forces, acting on the same object, are in equilibrium when they have a zero resultant.

3.3 (a) (ION 2 10 mm

50N 2 50 mm  
80N 2 80 mm) 8  
50mm (5km)  
V 2 113 mm

Resultant force is 113N, at an angle of 380 with the SON force.

(1)) Equilibrant will be 113N, Opposite direction of the resultant. -  
(c) (i) Resultant force is the single force which has the same effect on an object as all the other forces together.

(ii) Equilibrant force is the single force that keeps the other forces in equilibrium. It has the same magnitude as the resultant, but acts in the opposite direction.

(K; Total 20

AND now for some more questions.

You will find the answers upside-down on this page '

Question 4

4.1 Three forces 131, F<sub>1</sub> and F<sub>2</sub> act at the same point as illustrated in the following diagram.

I

#33: MN

((1) Give the triangle law of forces. (3)

(1)) Apply the triangle law and determine graphically the resultant of the three forces.

(Scale: 10 mm to 1N). (5)

(6) Are these forces in equilibrium? Explain your answer. (4)

4.2 A weight of 100N is maintained in equilibrium by means of two strings as indicated in the diagram.

QUINCY

TURN THAT TV OFF AND

CONCENTRATE ON YOUR

HOMEWORK, QUINCY

'The tension in this string is indicated by One string acts in a horizontal direction.

T<sub>1</sub>. The other string acts at an angle of 30° with the vertical. The tension in this string is indicated by T<sub>2</sub>.

(a) Draw a vector diagram of the three forces in the diagram. (3)

(b) What law can be used to represent three forces in equilibrium? Give this law. (4)

(c) Calculate the magnitude of tensions T<sub>1</sub> and T<sub>2</sub> in the diagram. (6)

1251

Question 5

5.1 A force of 180N acts in the direction 60°. Determine the magnitude of the vertical and horizontal components of this force. (8)

5.2 A man pulls a wagon along a horizontal surface with a force of 250N. The rope makes an angle of 50° with the horizontal surface.

(a) Determine the magnitude of the

(i) component in the horizontal direction (4)

(ii) component that tends to lift the wagon from the ground. (4)

(17) Suppose the magnitude of the angle between the rope and the horizon-

tal surface is increased to 706. How  
 will the magnitude of the horizontal  
 and vertical componeWK) be in-  
 huenced? A 9., ' ., (4)  
 (c) What will the magnitude of the hori-  
 zontal component-b , , \_' , '1 s ;  
 between the rope alia'theihorizontal  
 surface reaches 900? ,7 \_ (1)  
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 ANSWERS / SHEIMSNV  
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 By Ted Shearer  
 THERE I'VE 607 30 OTHER

KIDS TO TAKE THE HEAT  
7,-

Yes, we have a winner for Learning Pressi competition No 1.

You set us a tough task but after considerable thought, the judges from Via Afrika and City Press came through.

She is CYNTHIA SIBONGILE SIBIYA of Diepdale High. Congratulations Cynthia.

Our thanks to all the many replies we received. We would have liked to send you personal replies, but it is just not humanly possible. We would like to tell you how much we appreciated the fact that you took the trouble to write to us and most of you (not all) replied to the two questions we asked.

1 Unfortunately there is only one winner per competition. But we would briefly like to thank some of you now. Jan Sebati of Pietersburg, thank you for your short letter. How about seeing that your school gets Learning Press on a weekly basis? Then your school will most certainly become more educated.

We note that there are so many of you who need Mathematical instruction. Cynthia Sibongile Sibiya (left), our matric winner of Competition No 1. Cynthia, who is at Diepdale High in Soweto, is seen here with her fellow classmate, Obed Tshepe and their Mathematics teacher, Mr Siza Shongwe.

We gratefully acknowledge the following companies who have given us their financial support, making it possible for this project to be undertaken: Sappi Limited, for supplying the newsprint at cost; Via Afrika; Allied Building Society; Anglo American and De Beers' Chairmans Fund; Borden Foods, makers of KLIM; Caltex, CNA; First National Bank; Gencor; Goldfields SA; Gypsum Industries (Rhino); National Media Ltd; OK Bazaars; Old Mutual; Perskor; Protea Assurance; The Southern Life Association Limited; Shell Petroleum and South African Breweries.

30 Educational Supplement to City Press - 2 October, 1988

Congratulations to our Winner No 1 - Ephias Sibuyi of Hoedspruit, Setati Kweni of Nthuba High School, Henry Mkhombo of Phalaborwa, Francinah Tetswane Sethowa, of Khaiso Secondary School and many many more.

To Pilane Suzan of Tlhabane: we would dearly vote you as next Minister of Finance for this country seeing 'you envisage the R125 being paid into a bank to make lots of money so that books can be bought for the whole school'.

SILAS MARNER

From page 25

ANSWERS / SHHMSNV

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GEOGRAPHY

From page '27

the warm front (1) brings rain..

2.7.6 The tropical cyclone occurs  
only in late (1) summer and early  
autumn when the temperatures are  
high enough. The temperate cyclone.  
occurs in summer and (1) winter, but  
is better (1) developed in winter.

2.7.7 The tropical cyclone is asso-  
ciated with the tropical easterly  
winds (1) in both hemispheres. The  
temperate cyclone is associated with  
the westerly (1) and polar easterly  
(1) winds in both hemispheres. (30)  
3.1 Explain why in South Africa the  
850 mb pressure surface is used to  
show pressure on the synoptic weath-  
er map.

South Africa is generally of a high  
altitude (1), and so it is meaningless  
to reduce the pressure readings to  
sea-level (1) as is usually done.  
Pressure over the plateau is shown  
by means of contours of pressure (1),  
based on the fact that a constant  
pressure in the earth's atmosphere  
To Nelly Lamola of Tembisa: An  
English dictionary is most certainly  
one of the most useful and necessary  
books.

To Pumezo Ntyweyi Of Peddie:  
Please carry on buying Learning  
Press as we are covering the

networks of Macbeth and the poems.

We will be running a Commerce  
section next year.

Please keep on entering our week-  
ly competition and you might just be  
the lucky winner next time and then  
be able to buy your text book, dictio-  
nary, Mathematical instruments or  
other much needed equipment.

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ANSWERS I SHEIAASNV

does not exist at a constant height  
above sea-level (1).

The 850 mb pressure (1) surface  
has been chosen because this is more  
or less what the pressure is at the  
height of the plateau. The height of  
the 850 mb pressure surface is  
shown by means of contours (1).

Where the pressure surface is  
high - i.e. the contour reading is  
high - the pressure will also be high  
(1). Where the pressure reading is  
low \_ o.e. the contour reading is low  
- the pressure will also be low (1).

The height of the 850 mb pressure  
Surface changes from place to place

and (1) from day to day.

The height of the contours is measured in geopotential (1) meters. The contours are drawn at intervals of 10 g.p.m., (1) and are drawn as solid lines (1). (12)

3.2 How is sea-level pressure shown on a synoptic weather map?

This is indicated by means of isobars (1) measured in millibars (1), and drawn at 2 millibar intervals (1). These isobar measurements have been reduced to mean sea level (1). 'l'hc isobar lines are shown by means of dotted lines(1). (5)



2 PAPER 1: Creative Writing,  
Comprehension and Language  
GENERAL REMARKS ON THE  
SECTION iiANOTHER PIECE OF  
WRITING

In this section you are expected to choose one topic from a variety of kinds of writing - for example: informal letters, minutes, reports, diaries and dialogues. The allocation of marks for this section is 30.

The most important thing to remember is that the piece you write in response to the topic you choose, must be APPROPRIATE. This means that you must make sure you know what the purpose is for writing the piece - address your writing to the right audience (i.e. the reader). Use the right tone (e.g. - a friendly, informal tone for a letter addressed to someone you know well; a polite tone for a letter to someone you have never met; a neutral, factual tone when writing a report or minutes.

Think carefully when you work out the introduction and the conclusion: the reader must know immediately what you are writing about, and what your purpose is when he reads the first paragraph; he must feel satisfied that you have brought the subject to a proper close.

1 Appropriate convention appropriate  
, , m;

to a particular kind of writing (e.g. - a formal letter, a letter to a friend, a letter to the editor of a newspaper and the minutes of a meeting all look different for specific reasons).

, Plan, draft, REVISE and polish your work with the above requirements in mind.

WHAT IS YOUR PURPOSE?

Informal letters - when you write an informal letter (often called a friendly letter), you want to pass on some news/information to someone you know. A letter of condolences, of apology or to congratulate someone as well as a chatty letter to a friend belongs in this category. So, a good idea is to jot down a few notes about the INFORMATION you will supply when you write on a topic of this nature.

Exercise One - jot down a few notes on the information you would supply in a letter on each of the following topics:-

(a) you have an uncle who is a farmer. You once spent a very enjoyable time on his farm and would like to go there again. Write to him, asking whether you can perhaps help with the harvesting during the summer vacation.

(b) your best friend is away on holiday, and you are looking after

his/her kitten. In a letter to your friend describe how it was saved from certain death.

Note: READ each top'ic'carefully.

Topic (a) Have you noticed that your purpose is to-ask something special?

You want to work in return for a favour?

Your introduction will probably refer to your previous visit?

You should avoid referring to a particular kind of crop being harvested unless you know that it is, in fact, a summer crop in that particular region?

Topic (b) Have you noticed that your purpose is to let your friend know that his/her kitten is well?.

In addition, you tell him/her about an incident in which the animal nearly died.

You assure him/her that you will look properly after his/her pet until he/she returns.

Formal letters - here too your purpose is to communicate with the recipient of your letter - so you will make sure that you give him ALL the facts he needs to respond to your letter in the way you expect him to (e.g - send the goods you order; consider your job application l'avouable; and do whatever is necessary in the case of a complaint). - 6:

You should be able to provide the information he needs in about 120 words - but a paragraph of only a few lines will definitely be inadequate. For this reason it is important that you jot down notes on the purpose of the letter and the information the reader needs. Do this before starting to write the letter.

Exam! two - jot down a few

notes on the information you would supply'in each of these letters:

(a) a p erty company is negotiating to b&ne of the most beautiful parks in your town as the site of a huge business complex. Write to the editor of your local newspaper, setting out your objections to the plan, and asking others to join you in resisting it.

(b) You have recently had your house painted by a large firm but you are dissatisfied with the work. Write to the manager, stating the reasons for your dissatisfaction and what you would like him to do.

Note: READ the questions carefully

Topic (a) Have you noticed that your main purpose is to object to the construction of a business complex

Because your community will lose a beautiful park?

You also want to ask others to join you in resisting the plan?

You can group your objections:  
those that affect the whole community and those that are of a more personal nature?

You should mention mainly those objections with which most of the readers will agree with - so that they will support you in public?

Topic (b) Have you noticed that your purpose is to complain about unsatisfactory work.

AND ALSO to make suggestions about what should be done about it?

You should, therefore, carefully select decorating jobs (6 g \_ painting) about which you know enough to be able to describe what is wrong?

Your suggestions about what should be done about the matter must be reasonable - so that the manager of the firm responds positively to your complaint and suggestions?

#### THE DIALOGUE

Here the emphasis is on writing a conversation that could actually take place. It must therefore - Contain the language of ordinary speech. Should not contain stilted, wordy expressions people would not use when talking naturally to each other.

It should reflect appropriate feelings about the matter in hand and, have an appropriate beginning and ending.

Exercise three \_ study this question and then answer the questions that follow:

It is the first week of term, and you have just spent most of your pocket money for the term on some new casual clothes. When you get home, your mother is far from pleased. Write down your conversation with her in 'logue form. How much pocket money do you get per term?

What are you supposed to do with it?

1. A4

Why would you spend it on casual clothes?

Would your parents (i) have additional money to give you if you spent all your pocket money before the end of term? Or (ii) give you additional pocket money in a situation like the one described in the topic, if they are well-off? Why?

Make a list of the words that might describe your mother's feelings.

Make a list of the phrases you might use to apologize.

What would you call your mother, if you had to speak to her in English? (If you do not address

her at home in a formal way, don't  
do so now! But show respect in  
WHAT you say to her.)  
Exercise four e The report. This is a  
factual account of something wit-  
nessed or experienced.  
By now you should have a good  
idea of how to read the topics set to  
make sure you - UNDERSTAND  
each topic correctly; THINK ana-  
lytically about each topic so that you  
will include appropriate information  
in whatever you choose to write; and  
JOT DOWN USEFUL NOTES,  
to help you when you plan your  
writing once you have made a selec-  
tion from the topics set.  
Next time we shall deal with the  
other matters mentioned in the Gen-  
eral Remarks above, after which  
notes on the Comprehension, the  
Summary and the Language section  
of the examination paper will follow.

ANSWERS/ suaMSNv

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ANSWERS/ SHEIAASNV

TODAY we continue with the discussion on Macbeth starting with' Act I Scene IV -

The King inquires whether the traitor, the Thane of Cawdor, has been executed yet. Malcolm, his son, replies that according to reports nothing in his life

Became him like the leaving it: he died

As one that had been studied in his death, '

To throw away the dearest thing he owned,

As it were a careless trifle?

Macbeth, Banquo, Ross, and Angus make their entry. Duncan expresses deep-felt gratitude for Macbeth's military service to him:

it . . . only I have left to say, More is thy due than more than all can pay?

Macbeth responds to this praise by stating his duties to the King and the kingdom.

Duncan promises Macbeth and Banquo rewards for their services, and then pronounces his eldest son, Malcolm', Prince of Cumberland, so ' ' indicating who his successor will be.

Macbeth then receives the honour of being host to Duncan at his castle, Inverness.

Macbeth reacts with murderous thoughts to the news of Malcolm's new title. He hides his real feelings and leaves to prepare his castle for the King's arrival.

Duncan concludes the scene by continuing his praises for a man whose innermost thoughts are of treachery and murder:

He is a peerless kinsman?

(peerless means one who has no equal; kinsman is a relation).

#### CHARACTERS

Duncan, King of Scotland, is shown to be a just and generous king. The traitor Cawdor is executed, but gratitude, thanks, and payment are given to his supporters, especially Macbeth. Those who defended him and his kingdom are to be rewarded. Banquo and Malcolm show respect, love, and loyalty to the King. Banquo is referred to as a noble Banquo and a worthy Banquo; such praises describe his moral worth. Macbeth, who, before this scene, revealed murderous ambition against the King, has now assumed the disguise of a hypocrite. He pretends to be the King's loyal subject, but he wishes to take the throne from him. He is no longer the King's worthiest cousin? He knows that his ambitions are evil.

#### THEMES

Two manifestations of evil are treachery and deception, which began in Act 1 Scene 1. They are the

dominant themes in this scene. The traitor Cawdor is executed for his ,part in the rebellion:

li...very frankly he confessid his treasons,

Implorid your highnessi pardon and set forth

A deep repentance?

The Thane of Cawdor repents,

For in my way it lies?

The Prince of Cumberland is seen

as an obstacle which must be re-

moved if Macbeth is to gain his

ambitions. Such treacherous

thoughts and ambitions must be hid-

den, and Macbeth deceives the King

and the court with the face and

behaviour of a loyal subject. Hypoc-

risy is an important theme in the

play. ,

Hypocrisy and deception provide

occasions for great irony. For exam-

ple, Duncan says of the executed

Thane of Cawdor:

ltTherets no art \_ .

To find the mindis construction in

the face:

He was a gentleman on whom I built

An absolute trust Ji .

(construction means the moral state of the mind)

The irony here is that Duncan

"Our duties are to your throne and state, children and servants" says

Macbeth to the King of Scotland, Duncan. Macbeth is played here by

Lawrence Folley in the 1983 opera production of the tragedy.

which will make him different from

the next Thane of Cawdor, r Mac-

beth, who cannot or will not repent.

Macbeth,s treacherous and ambi-

tious thoughts against his King and

the Prince of Cumberland are re-

vealed in an aside (See Act I Scene

111):

ltThe Prince of Cumberland! that is a

step

On which I must fall down, or else

o,er-leap, '

PA 61'

does not know that he has failed to

read Macbethis face and see behind

it his treasonable thoughts. A fur-

ther irony is thatjust as he placed an

absolute trust in Cawdor, so he now

places an absolute trust in Macbeth.

To reinforce the ironies, Shake-

speare has Macbeth enter while

Duncan is speaking e another abso-

lute trust will be betrayed. (The

audience has knowledge about Mach

beth that is not shared by Duncan). \_

The themes of treason, unlawful

ambition and hypocrisy are high-

lighted by Macbethis knowledge of

the nature of loyal and virtuous ser-

vice to the King. Macbeth himself

makes his duties to Duncan quite

. clear:

llThe service and theloyalty I owe,

In doing it, pays itself. Your high-

nessi part

Is to receive our duties: and our

duties

Are to your throne and state, children and servants;  
Which do but what they should, by doing everything  
Safe toward your love and honour?  
This means that Macbeth is fully conscious of what his duties are, and he chooses to disregard them to get what he wants - the crown of Scotland.

Kingship in Scotland is a difficult concept, for unlike the system in England, the eldest son did not necessarily become King. The English practice in which the eldest son becomes King is known as the law of primogeniture. In Scotland, the system was simply that the most able man of royal blood was elected King. This system did not always work, and very often a power struggle resulted.

When King Duncan proclaimed his eldest son Prince of Cumberland, he was trying to establish a good successor and bring stability to the royal succession. Macbeth is of royal blood himself; he and Duncan are cousins. When Duncan says:

liWe will establish our estate upon  
Our eldest, Malcolm, whom we name hereafter

The Prince of Cumberland  
Macbeth's ambitions are frustrated. His murderous thoughts grow in intensity.

#### LANGUAGE

Good and Evil are represented in two main image clusters in this scene.

Planting, growing, and harvesting, which are natural and good processes, are represented. Duncan says to Macbeth: \_

itI have begun to plant thee, and will labour

To make thee full of growing?

In a stable kingdom, a good King will foster the development of his subjects; he will see to it that they grow in honours and in his love.

Banquo understands this, and when complimented, replies:

ItThere if I grow, '

The harvest is your own?

A good King will reap love and loyalty from men like Banquo.

Darkness represents evil, and becomes one of the most important image patterns in the play.

When Macbeth once again contemplates the murder of his King, he rejects light which represents Good:  
iiStars, hide your fires!

Let not light see my black and deep desires?

He wants the physical darkness of night to cover up his evil deed so that it cannot be seen:

itThe eye wink at the hand? a  
(wink means not to see)



Macbeth does not want the eye to  
see what the hand is doing i.e. murder  
must be done in darkness.  
Macbeth experiences his iiblack  
and deep desiresii before he meets his  
wife, and' without any prompting  
from her.

From The Achiever Series Notes on  
Macbeth by Hillary Semple. The  
Achiever Series is available from  
your local book shop.

I 28 Educational Supplement to City Press - 2 October, 1988 ,

## BIOLOGY

### PARAGRAPH QUESTIONS

Paragraph questions may be asked in various forms. Very often they are based on diagrams. They may also be of the Data-Response type of question. Make sure that you READ THROUGH the questions carefully, so that you understand what is being asked. This is section B of the paper, where a choice is allowed

Either two-thirds or three-fifths of the paper consists of this type of question. It is advisable to read through all the questions of section B and then begin with the question you know best. Remember, you may answer the questions in any sequence you like, but make sure you number your questions correctly. Remember to keep all the sub-divisions of the question together.

Some examples of paragraph questions.

1. The living together of different organisms in a close relationship in an ecosystem is known as symbiosis. There are different forms of symbiotic relationships. Discuss the following relationships and give examples:

(a) mutualism (10)

(b) commensalism (10)

1.2 What two types of competition are there? Discuss the two types, giving examples. (8)

1.3 Compare and contrast predation and parasitism, giving examples (12)

1.4 Draw a diagram to illustrate the flow of energy through an ecosystem, explaining the form of energy in each case. Discuss the decrease of initial energy as it passes through the ecosystem. (20)

1601

Figure 1

2. Figure 1 is a diagram of an alveolus in the lung.

2.1 What process is taking place as illustrated in the diagram? (1)

2.2 What gases are mainly found as represented by A, B and C? (3)

2.3 Explain why it is possible that exchange of gases takes place between the structures represented above. (5)

2.4 Say why the vein into which the capillary flows differs from the other veins in the body. (3)

2.5 Discuss the mechanisms of breathing involved in the process illustrated above. (18)

2.6 Discuss the skin as a sense organ. (18)

2.7 Discuss the structure of the middle ear. (12)

1601

Figure 2

3. Figure 2 is a diagram of the human brain.

3.1 Label the parts A, B, C and D.  
 3. 2 Which part of the brain is responsible for each of the following:  
 3 2.1 memory  
 3 2.2 the tension in the muscle  
 3.2.3 the dilation or constriction of blood vessels  
 3.2.4 control of balance of the body  
 3.2.5 consciousness and emotions  
 3.2.6 actions involved in breathing

sin 60° cos 60°  
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 II

# Exercise

From page 26

## MATHEMATICS

If  $\theta = 29.2900^\circ$ . calculate, without using tables, the value of  $\tan 6^\circ : \sec 60^\circ$   
 $\cos 330^\circ - \cos 45^\circ \csc 225^\circ - \sin 270^\circ$

Solution

$\tan 6^\circ : \sec 60^\circ \cos 330^\circ - \cos 45^\circ \csc 225^\circ - \sin 270^\circ$   
 $: \sec 60^\circ \cos (360^\circ - 30^\circ) - \cos 45^\circ, \csc (180^\circ + 45^\circ) - \sin 270^\circ$   
 $: \sec 60^\circ \cos 30^\circ - \cos 45^\circ \csc 45^\circ - \sin 270^\circ$

F- /\_

1 2 v2 1  
 : B 1 1 - 1  
 - \_Ji

Hence  $9^\circ - 60^\circ$

ing? (6)

suamsrw/ ANSWERS

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ADDRESS. One entry will suffice. All entries will be judged by a panel of judges from City Press and Via Afrika to flnd the winner. Their decision, however, will be final and no correspondence will be entered into.

Entries close on 20th October, 1988, and the winneris name will be published in Learning Press N01 7. Good luck.

Educational Supplement to City Press - 2 October, 19881 29

$(5 \sin x - 3)(\sin x - 3) z = 0$   
 01X . ' Ssinx-320 or sian-3:0  
 ulwmm t: e TRIGONOMETRY . 1 5 sin .v': 3 \$111 x : \_ 3  
 iii!!!!!!!!!!!!!!!!!!!!!! 1 N 1: EQUATIONS (consists of half an sm x : g lmpossxble  
 h '1111'1111111111111111 I / hour of the exam paper). Functional sin x : 0,600 a I  
 ' 11111 11 i values for certain angles must be x : 36a 54' or z 180" 4 36 54  
 known. The following figures are - x : 1430 6'  
 therefore necessary: it: SIMPLIFICATIONS  
 Note the sign of the functions in the quadrants:  
 MATHEMATICS  
 t sin all  
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 , ' \_ A lso remember  
 0 11,0 - If x e (90"; 180"), then we write x : 1800 - 0, with 6 acute.  
 , If x e (180'; 270"), then we write x : 1800 -1- 9, with 0 an acute angle.  
 If x e (270'; 360'), then we write x : 360o - 0, with 0 an acute angle.  
 ' In other words, ifx is an angle in thc'second quadrant, we write x : 180a - 0, 0  
 2 acute.  
 Ifx is an angle in the third quadrant, we write x : 1800 Jr 0, 0 acute.  
 ' Ifx is an angle in the fourth quadrant, we write x : 360" \_ 6, 0 acute.  
 I We must also know that:  
 1 .  
 a sin (900 - 6) : cos 0 .  
 90' 270 cos(90o - e) : sin e  
 The radius is always positive. 560 (900 ' 9) : 00360 9 cofunctions  
 .1 t cosec (90 - 0) : sec 0  
 Solve the following equations for 0 il61 e 10' 36001 tan (90o - 0) : cot 6  
 (i) sin 6 2 1; cot (900 w 0) 2 tan 0  
 0 : 30' or ' 0 2 1800 - 300 Likewise \_ . . . .  
 : 150' u sin (90" Jr 9) : cos 0 (sm lS posmve in 2nd quadrant)  
 (ii) sin 0 : \_ ,L cos (90' -1- 9) 2 \_sin0 (cos is negative in 2nd quadrant)  
 0 : 180" 1 30' or 6 : 3660 \_ 300 sec (90' 1 0) : -cosec 0 (sec is negative in 2nd quadran  
 t)  
 : 2100 : 3100 1 cosec (90a 4- 0) : sec 0 (cosec is positive in 2nd quadrant)  
 (iii) cos 9 : ,1; 1 tan (90" 1 .0) : -cot 0 (tan is negative in 2nd quadrant)  
 3 : 60' or 0 2 360' \_ 60o cot (900 -1- 0) : -tan 0 (cot is negative in 2nd quadrant)  
 : 3000 Please note HG. lf 6 is an acute angle, then -0 lies in the fourth quadrant.  
 (1V) cos 9 : -% \_F Therefore: .  
 e : 180' -i- 60' or 9 z 1800 \_ 60" m (-9) : \_5m 9  
 : I20" 2 2400 cos (\_9) : cos 6 .. .  
 (v) tan 9 z 1 , tan (\_0) : -'tan 9 ' cos and see are posmve ln the fourth quadrant  
 9 : 450 or e : 180' 4r 450 s " cosec (-9) : -Cosec W ' .  
 ' \_ 2 225a sec(-0) : secG \_ , \_ 2,,  
 '(visyge ' ' It taie : ' \_\_\_\_1 ' ' . ' - cot (#9) : -cot6 ' - '  
 e : 180' - 45': or e : 360' \_ 45" \_i\_2 Examples . o - . ' o  
 : 135 : 315:: (i) Simplify: sm (90 1 9'11") (-0) tan (180 1 0)  
 . . . . . V . . cos (3600L 0) sm (180 -1- 0)  
 Note that a function 15 always positive in two quadrants and negative in two . o . o  
 quadrants, Solution sm (90 4e 9) 5m (--9) tan (180 -1- 9)  
 Examples cos (3600 4 6) sin (180' -1- 9)  
 c050 x -sin0 X tan0  
 (a) Solve for x ifx E (0': 36001:  
 6 sinzx - 5 sin x - 4 : 0  
 Solution: 6 sinzx - 5 sin x - 4  
 (2 sin x 4- 1)(3 sin x - 4)  
 cos 0 x -sin 0  
 0 . : tan 0  
 0 sin (180' - x) tan (900 - x)  
 2 sin x Jr 1 : 0 Or 3 sin x \_ 4 2 0 (ii) Simplify: COS (3600 \_ v) cot (1800 7L v)  
 25inx:-% 3sinx:4 ' . o ' o i  
 . \_ ' . ! . \_ sm (180 - x) tan (90 - x)  
 5m A : \_ ,E gm A 2 31 5011111011. 3600 . 1800  
 sinx : 1.333 cos(, \_ 3mm , 3 x)  
 e impossible : M  
 sin x : \_% ' cosx x -cotx  
 x z 180' wt 300 or x z 3600 e 300 ' : \_Sin x  
 : 210" : 330o cos x

(b) Solve for x if  $x \in [0, 100]$ ; 36001 Exercise

$2 \tan x \neq 4 \cot x : \operatorname{cosec} x \cdot \tan x \cos 360^\circ - x \cdot 0 \cdot 0 \cdot \dots$

Solution:  $2 \tan x \neq 4 \cot x : \operatorname{cosec} x$  1 Write  $-\tan(x) = -\cos(180 - x) \sin(90 - x)$  in its simplest form.

$2 \sin x \neq 4 (-\cos x : 1) \cdot (1 - \cos x)$  (Write all the functions in terms of  $\sin$  Solution  $\tan x \cos(360^\circ - x) = \cos(180^\circ - x) \sin(90^\circ - x)$

$\cos x \sin x \sin x$  and  $\cos x \operatorname{cosec} x$

$2 \sin x - 4 \cos x : \cos x \cdot \tan x \cos x$

$2(1 - \cos x) - 4 \cos x : \cos x (\sin x - 1 - \cos x : 1) \neq \operatorname{cosec} x - \cos x \cos A$

$2 \sin^2 x - 4 \cos x : \cos x \cdot \tan x \cos x$

$6 \cos x - 1 - \cos x - 2 \sin^2 x - \cos x \cos x \sin x - 1 - \cos x$

$(3 \cos x - 1)(2 \cos x - 1) : 0 : 5 \sin x - \cos x \sin x \cos x$

$3 \cos x - 1 : 0$  or  $2 \cos x - 1 : 0$  C0535

$3 \cos x : -2 \cos x : 1 : \sin x - 1 - \cos x$

$\neq$

$\cos x : -1 : 1$

3 Example: Calculate Without tables the value of:

$\cos x : -0.667$  or  $\cos x : 1 \sin 120^\circ \cos 300^\circ$

$x : 180^\circ - 48'12''$  or  $x : 180^\circ - 48'12'' \cos 310^\circ \cos 50^\circ \sin 130^\circ$

$x : 131'48''$  or  $x : 228'12''$  or  $0^\circ$

$x : 60^\circ$  or  $2 \sin 360^\circ = 0$  Solution M

$x : 60^\circ$  or  $2 \sin 360^\circ = 0$

$x : 300^\circ \cos x \cos 50^\circ - 1 - \sin 130^\circ$

$E - 2 \sin(180^\circ - 60^\circ) \cos(360^\circ - 60^\circ)$

Exercise  $\cos(360^\circ - 50^\circ) \cos 50^\circ \sin 180^\circ = 50^\circ$

Solve for x if  $x \in (0, 360]$ :  $\sin 60^\circ \cos 60^\circ$

$9 \operatorname{cosec} x : 18 - 5 \sin x$  :  $\tan x$

Solution:  $9 \operatorname{cosec} x : 18 - 5 \sin x$  :  $\tan x$   $\cos 50^\circ - \sin 50^\circ$

$9 \sin 60^\circ \cos 60^\circ$

$18 - 5 \sin x = 2500$

$\sin x \cos x$

$9 : 18 \sin x - 5 \sin x$

$5 \sin x - 18 \sin x - 9 = 0$  Turn to page 29

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## GEOGRAPHY

### CLIMATOLOGY 1

1. Examine this synoptic weather with pre-frontal' conditions (1). The cold front is approaching from the west (1) and so the south-eastern (1) part of the country is experiencing the weather conditions of the warm sector. (11)

1.4 Explain how an occlusion occurs. Because the cold front moves much faster (1) than the warm front, it catches up with and eventually overtakes (1) the warm front. The warm air is lifted up above- the cold (1) air. '

iThe warm air spreads out above map and answer the following questions.

GP s m SVNOPTIC WEATHER MAP

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with very low wind speeds. (1) or even calm conditions (1).

2.3.2 The skies may be clear (1), the temperatures very high (1) and the pressures very low (1).

2.3.3 The diameter of the tropical cyclone is about (1) 650 kms.

2.3.4 The core or eye is usually about 300 - 500 (1) kms in diameter.

2.3.5 The pressure at the centre of the cyclone is usually 950 millibars (1) (or hectopascals), and is low (1). (10)

2.4 Describe the weather conditions

INFERENCE: The cold front will move eastwards over the country and itewill become cold over most areas.

Rain and snowfalls can be expected m- r the south western and southern parts.

1.1 Identify the feature labelled A.

Name the direction of movement of this weather disturbance, and say with what wind belt the disturbance is associated.

Extra-tropical cyclone/temperate cyclone (1).It moves from west to east (1) in the belt of the westerly (1) winds. (3)

1.2 Explain the weather conditions found at B.

These stations represent post-frontal weather (1) conditions. The cold front has moved to the east (1), and has already passed over these stations. The weather stations show 3/4 cloud (1) cover, which shows that the cirrus and cumulo-nimbus (1) clouds are breaking up and subsided cumulus clouds form (1).

The weather clears as the showers end (1). The air is cool (1), as is shown by the air temperatures of 14 degrees C, 14 degrees C and 13 degrees C (1). The air is dry (1), because the dew point temperatures (1) are 5 degrees C and 6 degrees C.



The wind is blowing from a south-westerly(1)direction, which also indicates that these are post-frontal conditions. The wind is still strong (1), blowing at between 30 and 40 knots (1). (13)

1.3 Comment on the weather'conditions found to the east of the country (i.e. to the east of a line drawn from Luderitz to Port Elizabeth).

The air in this area is warm (1) and dry (1). This is shown by the warm temperatures, ranging from 18 degrees C - 29 degrees C (1), and the very low dew point temperatures (1), ranging from 9 degrees C - 18 degrees C (1) on the coast.

The winds are north-westerlies (1),and are gentle (1) winds, blowing at between 10 - 20 knots (1). These are weather conditions associated

Q the cold front (1) and no further (1) . associated with the passage of a uplift takes place. The rain eventually stops (1) and the cyclone weakens argies (1) as the differences between the two cold air masses are not sufficient to maintain a frontal system (1). (8)

1.5 Draw a well-labelled diagram to 77777777777777777777777777777777 2

illustrate a cold front occlusion. (10)

2.1 Tropical cyclones have different names in different parts of the world. Give two other names for these features.

Hurricanes in the Caribbean (1); typhoons in China (2)

2.2 List two important characteristics of tropical air masses.

These air masses have similar warm temperatures (1) and similar (1)humidities, especially when tropical maritime air (1) is involved. (3)

2.3 Describe the characteristics of tropical cyclones

2.3.1 Tropical cyclones have a centre (1) or eye of subsiding air

/ tropical cyclone over a station.

The tropical cyclone moves from east to west (1). As the cyclone approaches station, tall cumulonimbus (1) clouds will approach.

These clouds are about 12000 to 15000 m.a.g.l. Torrential rains (1)and violent winds will (1) be experienced.

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perienced, with' rainfall of 200 - 250 mm (1) of rain falling within a period of 24 hours. This causes extensive flooding (1).

As the storm moves to the west, the station will (1) be under the eye where calm, clear conditions will be experienced(1). As the storm continues to move to the west,the station

will again (1) experience a period of very stormy conditions as the rear - (1) of the storm hits the station. (1 1)

2.5 Draw a well-labelled diagram illustrating the main features of a tropical cyclone. -

(6)

2.6 List the conditions necessary for the formation of a tropical cyclone.

Tropical cyclones are not associated (1) with the jet stream. There must be an extensive area of ocean (1) with temperatures (1) of over 27 degrees C. Coriolis force must be present (1) to allow the development of a vortex (1).

So, tropical cyclones will not develop between (1) 5° N and 5° S of the equator, because Coriolis force is very weak at those latitudes. Tropical cyclones develop in conjunction with (1) the I.T.C.Z. and so tend to form in the late summer (1) and early winter in both hemispheres. (8)

2.7 Compare the conditions required for the formation of a temperate cyclone with that of a tropical cyclone.

2.7.1 Tropical cyclones require warm oceans (1) at latitudes (1) 5° - 15° S and 5° - 15° N; temperate cyclones form in the westerly (1) wind belts at 60° N and 60° S (1).

2.7.2 Tropical cyclones are associated with warm (1) air only; temperate cyclones are associated with warm (1) air from the 30° and cold air (1) from the 90° degrees. ,

2.7.3 The diameter of the tropical cyclone is usually about 650 kms (1), that of a temperate cyclone about 800 (1) kms.

2.7.4 Tropical cyclones are associated with the Intertropical (1) convergence zone; the temperate cyclone with the Jet (1) stream.

2.7.5 Tropical cyclones are circular in (1) form, with concentric bands (1) of towering cumulonimbus (1) clouds, violent (1) winds and very heavy rainfall (1) spiralling around an inner (1) calm area, the eye of the storm; temperate cyclones are circular in form (1), with the cold (1) and warm fronts rotating (1) around a low (1) pressure centre.

The cold front causes rain in summer (1) and rain and snow in winter;

Turn to page 30

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2.5 The main features of a tropical cyclone  
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## A COMPREHENSIVE STUDY GUIDE FOR ALL MATRICULANTS

Lealrnnng Pre

Barbara Hollingworth at her desk at the University of the Witwatersrand. Next month she will sit with examiners to mark Standard 10 English Language papers.

BARBARA Hollingworth is one of your examiners for the Standard 10 English Language paper.

Based in Johannesburg, Mrs Hollingworth works for a privately funded project involving the University of the Witwatersrand and the Department of Education and Training.

This is her fourth year as a full examiner. Prior to this she was an assistant examiner. Mrs Hollingworth has been in black education for 22 years. Twelve years of this period was spent teaching in classrooms in Zambia, Zimbabwe, Swaziland and East Africa.

She is concerned about the matrics who are soon to write the English Language examinations. Because she wants you to pass she gives the following vital hints: if you should circle all the important words in every question. So many marks are lost by not following the relevant questions. This occurs in all sections of the paper. If you circle every important word in a title and you look back - you can't go wrong?

The most common pitfall when doing summaries is to check whether the whole passage must be summarised or just a portion of it. Letters are also very important and in an informal letter you must look at what is required and adopt the correct tone. Mrs Hollingworth is a mother of three grown children and she knows what it is like to go through the anguish of helping her children get their matric. In her leisure time, which is scant, she exercises, goes to yoga classes, swims and takes long walks.

She is passionately fond of animals and supports four different animal societies. One of her greatest active campaigns is the struggle against animal experimentation. Her book, Teach Eninsb We II is widely used by teachers throughout South Africa. Three quarters of an hour English lesson in the classroom per day is not enough. Her advice to all of you studying English is - read, listen and speak the English language.

Good luck with your exams.

ENGLISH LITERATURE .

SILAS MARNER - STD 10

HOW did you score with the answers to Chapters three and four?

Look, upside down, at the end of this section of the series to see how you did.

In the meantime, let us look at

Chapters five and six with questions and answers on both these Chapters as well. Remember we've just completed Chapter four at the point where Dunstan has stolen Silas, gold from his cottage and has taken off into the woods.

#### . CHAPTER 5

##### SILAS DISCOVER? HIS LOSS

The second cleav in Silas life occurs when he discovers that his gold is gone. '

Silas was not far from his home when Dunstan left. He had been out to collect some wine, leaving the door unlocked because the meat for his supper was suspended with string from the key passed through the handle of the hanger over his fire. He did not fear a thief on such a dark wet night and noticed nothing amiss when he returned. He discovers his loss when he decides to count his gold before supper, cannot believe the gold has gone, searches everywhere, fears it may be a devil tormenting him, and then thinks of a thief.

This thought comforts him a little - ' perhaps the gold can be recovered \_ and he goes to report his loss to the men at the Rainbow Inn.

#### QUESTIONS

There is a contrast in this chapter between what Silas is expecting when he goes home and what he experiences. We, the readers, know that he is in for a shock and we wait in suspense for him to discover his loss. '

This week:

English literature  
Macbeth: Analysis of  
Scene 1V, Act 1

Biology

Our

Geography

The first of two parts

On Climatology

Mathematics

Trigonometry

How to tackle

paragraph questions

competition

Your chance at

another R25 and a

further R125 for

your school

Vol. 1 No.4

1. Read the paragraph. on p.47

it Anyone who had . . . isolation like its own? See how in answering the following questions we can sum up all we know about Silas.

(a) Why do Silas neighbours regard him with contemptuous pity, dread and suspicion?

(b) How was the light of his faith quite put out and his affections made desolate?

(c) What have his loom and his gold become?

((1) Quote two adjectives which describe Silasi existence.

x CHAPTER 6

THE COMPANY AT THE RAIN-BOW INN

The people of Raveloe can be divided into an upper and a lower class. The upper class are the gentlemen who own land and who do not work.

The Cass family, for example, are ' upper class. The labourers are the lower class, made up of farmers and tradesmen like a blacksmith and a wheelwright.

In this chapter we see these working men of Raveloe gathered at the Inn for their evening drink. The gentlemen of the upper class are at Mrs Osgoodis dance. , Each labourer shows his character in the way he talks: the landlord is friendly, the butcher jolly, and so on. Their conversation reveals some background to the village. Their last topic of conversation is ghosts.

QUESTIONS

This chapter does not advance the story but gives background to ' the village and broadens our knowledge: . of the type of community life from which Silas is cut off. The companionship at the Rainbow Inn is in direct contrast to Silasi lonely existence.

Here are two lists, one of the names of some of the men present and the other of their professions. See if you can match them up:

Mr Dowlas \_ landlord

Mr Macey v mole-catcher and poacher \_ '

Mr Snell - parish clerk

Mr Tookcy - farrier

,Mr Ben Winthrop assistant to parish clerk

Jem Rodney - wheelwright and leader of the choir

Turn to page 30 for the ' answers

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