Education and Sport Development

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NORTH WEST PROVINCE

PROVINCIAL ASSESSMENT

GRADE 10

TECHNICAL SCIENCES P1

JUNE 2019

MARKS: 100

TIME: 2 hours

This question paper consists of 9 pages including 2 data sheets.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions in the ANSWER SCRIPT.

2. Start EACH question on a NEW page.

3. Number the answers correctly according to the numbering system used in this question paper.

4. Leave ONE line between two sub-questions, for example between QUESTION 2.1 and QUESTION 2.2.

5. You may use a non-programmable calculator.

6. You may use appropriate mathematical instruments.

7. Show ALL formulae and substitutions in ALL calculations.

8. Round off your final numerical answers to a minimum of TWO decimal places.

9. Give brief motivations, discussions, etcetera where required.

10. Write neatly and legibly.

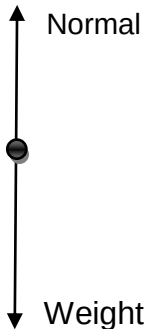
QUESTION 1

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the answer and write only a letter next to the question number, for example 1.5C.

1.1 Which one of the following physical quantities is a scalar?
A Time
B Velocity
C Displacement
D Acceleration (2)

1.2 Tension force exist when there is:
A String
B Cable
C Rope
D All of the above (2)

1.3 A diagram below shows all the forces that are acting on a certain object.

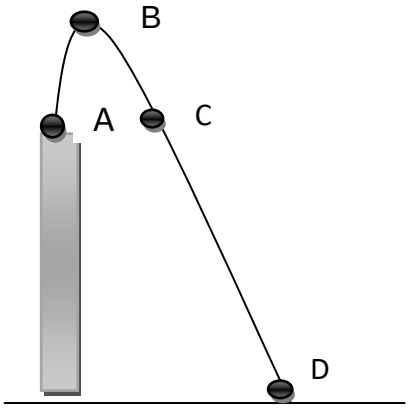


According to the diagram above, the force applied on an object is:
A To the right
B To the left
C Zero
D Equal to friction (2)

1.4 The product/s when hydrogen reacted with water is
A H_2O
B H + O
C HO_2
D $H_2 + O_2$ (2)

1.5 The conversion of 1000 m in a scientific notation is
A $1x10^3$ m
B $10x10^2$ m
C $0.1x10^{-3}$ m
D $1x10^{-3}$ m (2)

1.6 A stone from D was thrown to the top of the tank as shown in a diagram below. At what position is the magnitude of gravitational potential energy at minimum?



A Position B
B Position C
C Position D
D Position A (2)

1.7 Moment is also known as:
A Force
B Torque
C Distance
D Fulcrum (2)

1.8 Acceleration is:
A The rate of velocity
B The rate of distance
C The rate of change in velocity
D The rate of displacement (2)

1.9 The kinetic energy of the boy with a mass of 48 kg running at a speed Of 2.5m.s^{-1} will be:
A 120 J
B 150 J
C 300 J
D 60 J (2)

1.10. Two forces of magnitude A = 220N and B = 200N were applied as shown in the diagram below. The resultant of these force is:

A 420 N left
B 20 N left
C 20 N right
D 420 N right (2)

[20]

QUESTION 2

2.1 Convert the following physical quantities and show all workings.

2.1.1 83^0 C to Fahrenheit. (3)
2.1.2 500 g to kilograms (2)
2.1.3 65 min to seconds (2)
2.1.4 The standard notation of 0.00000165 m to scientific notation. (2)

2.2 If Shane covers a distance of 0.5 km at a speed of 2.52 m/s. Calculate the time he took to complete the 0.5 km distance. (4)

2.3 If a car is moving at a speed of 60 km/h then changes to 85 km/h in 0.02 hours. Calculate the acceleration of the car. (5)

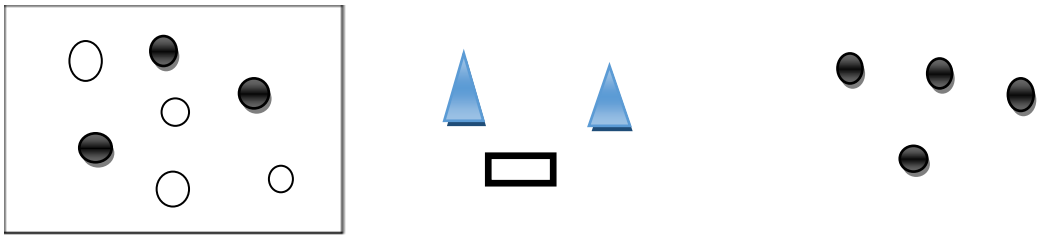
[18]

QUESTION 3

3.1 Define *pure substance.* (2)

3.2 From the sketches below, choose:

A B C



3.2.1 Elements (1)
3.2.2 Compounds (2)

3.3 Consider the substances listed below.

silicon; potassium; zinc; sodium; sulphur; fluorine; bromine; boron

From the list above, write down the:
3.3.1 Metals (3)
3.3.2 Non-metals (3)
3.3.3 Metalloids (2)

3.4 Write down the NAMES of compounds formed from the combination of elements given below and their symbol.

3.4.1 Carbon and chlorine (2)
3.4.2 Magnesium and oxygen (2)
3.4.3 Lead and sulphur (2)
[19]

QUESTION 4

4.1 Differentiate between kinetic energy and gravitational potential energy. (4)

4.2 Define mechanical energy. (2)

4.3 An object of mass 8.5 kg is held 0.4 m above the table which is 1 m high. When the object was dropped it moved with a speed of 2 $m.s^{-1}$ at height of 0.9 m above the floor.

4.3.1 Calculate the gravitational potential energy of the object relative to the table. (3)

4.3.2 What is the gravitational potential energy of the object relative to the floor? (4)

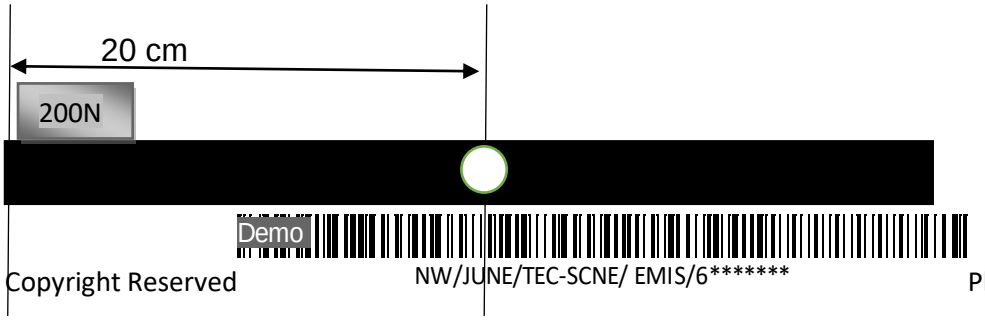
4.3.3 Calculate the kinetic energy of an object at 0.9 m above the floor. (3)

4.3.4 What is the mechanical energy of the object at 0.9 m above the floor? (4)
[20]

QUESTION 5

5.1 State the law of moment in words. (2)

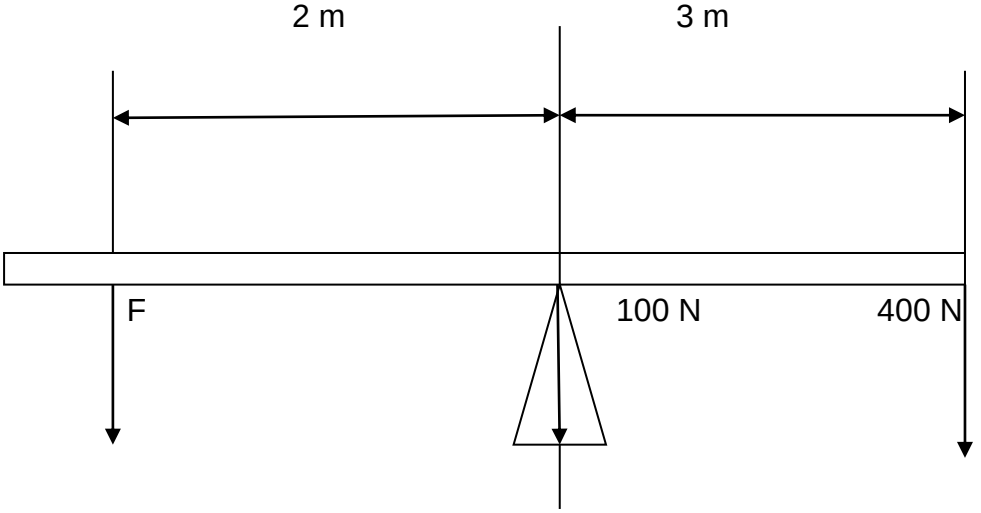
5.2 The weight of the block below is given as 200 N.



5.2.1 Determine the moment and write the direction. (4)

5.2.2 If another block with a weight of 300 N is put on the other side at the same distance. What is going to happen to a 200 N block? Take a guess and then prove it using calculation. (5)

5.3 The uniform beam in the diagram below is balanced when no loads are on it. The uniform beam weighs 100 N. Calculate the force F that must be applied to keep the beam in equilibrium, when a 400 N load is placed 3 m to the right as shown in the diagram below. (4)



5.4 Define mechanical advantage. (2)

5.5 If the length of the effort arm is 0.8 m and the load arm is 1.6 m. determine the mechanical advantage of the lever. (3)

5.6 If a load of 800 N is moved by a lever with a mechanical advantage of 1.5. What is the effort? (3)

[23]

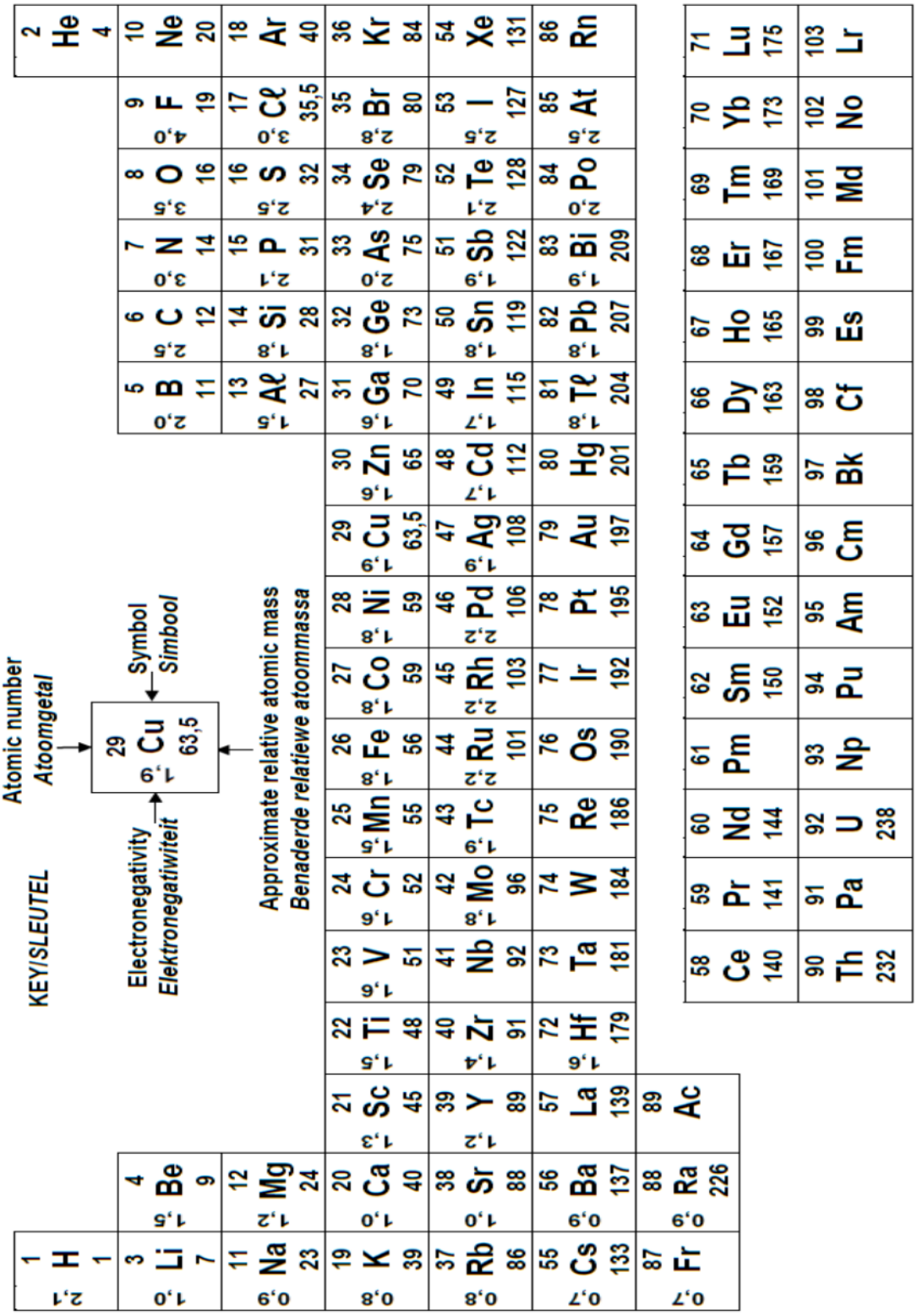
GRAND TOTAL: 100

TABLE 1: PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Acceleration due to gravity	**g**	**9.8 m.s^{-2}**
Charge on electron	**e**	**-1,6 × 10^{-19}**

TABLE 2: FORMULEA

MOTION	ENERGY
Speed = distance/ time **Velocity = displacement/ time** **Acceleration = change in velocity/ time**	**Ep = mgh or U = mgh** **Ek = $\frac{1}{2}mv^2$** **ME = Ep + Ek**
FORCE	**MOMENTS**
Fg =mg **Fres = $F_1 + F_2$**	**Moment = F× d** **OR** **Torque = F × d⊥**
SIMPLE MACHINES	
MA = $\frac{L}{E}$ OR MA = $\frac{e}{l}$	


KEY/SLEUTEL
Atomic number
Atoomgetal
Symbol
Simbool
29
Cu
63,5
Electronegativity
Elektronegatiwiteit
Approximate relative atomic mass
Benaderde relatiewe atoommassa
1 (I)
2 (II)
3
4
5
6
7
8
9
10
11
12
13 (III)
14 (IV)
15 (V)
16 (VI)
17 (VII)
18 (VIII)
H 1
He 4
Li 7
Be 9
B 11
C 12
N 14
O 16
F 19
Ne 20
Na 23
Mg 24
Al 27
Si 28
P 31
S 32
Cl 35,5
Ar 40
K 39
Ca 40
Sc 45
Ti 48
V 51
Cr 52
Mn 55
Fe 56
Co 59
Ni 59
Cu 63,5
Zn 65
Ga 70
Ge 73
As 75
Se 79
Br 80
Kr 84
Rb 86
Sr 88
Y 89
Zr 91
Nb 92
Mo 96
Tc
Ru 101
Rh 103
Pd 106
Ag 108
Cd 112
In 115
Sn 119
Sb 122
Te 128
I 127
Xe 131
Cs 133
Ba 137
La 139
Hf 179
Ta 181
W 184
Re 186
Os 190
Ir 192
Pt 195
Au 197
Hg 201
Tl 204
Pb 207
Bi 209
Po
At
Rn
Fr
Ra 226
Ac
Ce 140
Pr 141
Nd 144
Pm
Sm 150
Eu 152
Gd 157
Tb 159
Dy 163
Ho 165
Er 167
Tm 169
Yb 173
Lu 175
Th 232
Pa
U 238
Np
Pu
Am
Cm
Bk
Cf
Es
Fm
Md
No
Lr